

DOCUMENT RESUME

ED 167 449

SO 011 523

TITLE Energy and Conservation Education: Activities for the Classroom, Grades 1-3.

INSTITUTION Energy and Man's Environment, Inc., Portland, Oreg.

PUB DATE 78

NOTE 366p.; For related documents, see SO 011 524-529

AVAILABLE FROM Energy and Man's Environment, 0224 S.W. Hamilton, No. 301, Portland, Oregon 97201 (\$24.00)

EDRS PRICE MF-\$0.83 Plus Postage. HC Not Available from EDRS.

DESCRIPTORS Class Activities; Classroom Games; Concept Teaching; *Conservation Education; Depleted Resources; Educational Objectives; Elementary Education; *Energy; *Energy Conservation; *Environmental Education; Environmental Influences; Fuels; Futures (of Society); Grade 1; Grade 2; Grade 3; Instructional Materials; Interdisciplinary Approach; *Learning Activities; Natural Resources; Social Studies; Student Evaluation; Teacher Developed Materials; Teaching Guides

ABSTRACT

The instructional materials and classroom activities described in the document are intended to aid teachers in grades one through three develop and implement educational programs dealing with energy-related issues. The document is presented in four sections. Section I explains the organization of the document and summarizes how teachers should implement activities and assess student performance. Section II consists of a matrix of activities described in the document. Information is presented on grade level, time required, and subject matter. Section III describes learning activities in six areas: (1) sources of energy, (2) uses of energy, (3) conversion of energy from one form to another, (4) impact of energy use on the environment, (5) limits of the earth's resources, and (6) the future. For each activity, information is presented on title, concept, time, implementation, materials, and optional activities. Activities involve students in posing and answering questions, role playing, viewing and discussing films, comparing samples of energy sources, completing handouts, coloring, defining terms, playing educational games, and writing stories. The final chapter presents information on student assessment. Topics discussed include suggested test items, how to use suggested test items, and origin of test items. (DB)

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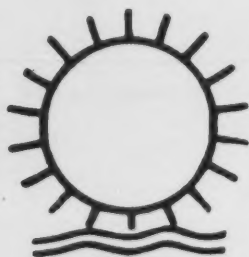
Activities for the Classroom

Grades 1-3

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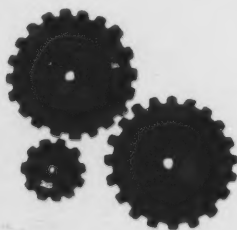
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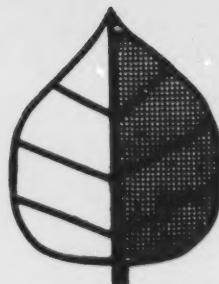
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IMPACTS

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CREDITS

The Learning Activity Packages are the result of a three-year development effort by Energy & Man's Environment and educational agencies in the Northwest. The development project was designed to produce practical and objective energy and conservation education classroom resources.

Phase I of the development process began in 1972, when educators and industry representatives met under the leadership of the Washington State Department of Public Instruction to establish a framework of goals and objectives essential to an understanding of energy and energy-related environmental issues. Six principal topic areas were identified: Sources of Energy, Uses of Energy, Conversion of Energy, Impacts of Energy, Limits of Energy and Future Sources of Energy. Each topic was described in the form of multidisciplinary goals, concepts and objectives. The framework was expanded into an Activity Guide and subjected to testing and revision. This Guide appeared at the beginning of the energy dilemma and served as a model for many subsequent efforts across the United States. Contributors to the first edition of the Guide were:

La Von Bucher, Teacher
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The second phase of the instructional materials development began in 1973. With the assistance of state departments of education, EME selected and contracted with six outstanding school districts to develop teacher-made instructional materials based on the Activity Guide framework. The districts selected were Cheyenne, Wyoming; Everett and Olympia, Washington; and Beaverton, Eugene and Medford, Oregon. Key Area Resource Persons in Phase II were Bob Larson, Larry Torgerson, Floyd Smith, Lois Helton, and Lyle Wilhelmi. Phase II continued for nine months and produced a wide range of multidisciplinary, 1-12 instructional resources.

In September, 1974, Phase III of the curriculum writing effort began with the awarding of a substantial contract to the Beaverton, Oregon School District. Under the direction of Lois Helton, a team of master teacher writers scrutinized, refined and rewrote the materials produced in Phase II. The team was composed of Dan Grimes, Mabel Lund, Shirley Barnes, and Ted Parker. Essential to the success of this effort were Dalton Piunkett and Harold Wik, who provided leadership and facilitated the development process. Chloe Poole and Omer Gosnell added their creative skills to design and illustration.

Concurrent with the initiation of Phase III, a skilled group of writers from business, industry, government and the private sector came together to revise and strengthen the Activity Guide. Utilizing several hundred evaluations from teacher-users, the writers refined the conceptual framework, expanded the resource material and created a new organizational structure. The result was a set of seven Activity Guides described by one leading curriculum administrator as "the single richest source of energy and conservation education teaching ideas available anywhere." The new material was used by Phase III writers and keyed to the expanded framework of topics, concepts, and instructional objectives. Authors of the new Activity Guide were:

La Von Bucher, Teacher
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Don Charnley; Attorney, Legislator
Ed Dalton, Teacher
Roberta Davis, Parent
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Lois Helton, Teacher
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Dave Kennedy; Administrator,
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Keith Loeffler, Energy Information
Jack Vogel, Energy Information
Harold Wik; Administrator,
Curriculum
Lyle Wilhelmi; Administrator,
Curriculum
Warren Wolf, Art School Director

In 1975, Learning Activity Packages from Phase III were placed in Beaverton, Oregon and Everett, Washington schools and subjected to vigorous classroom evaluation. External, third-party assessment was instrumented and supervised by Dr. Quentin Clarkson of Portland State University. Supervision at the school district level was managed by Wayne Neuberger, Evaluation Specialist for the Beaverton School District, and Jim Pringle in the Everett, Washington School District. Teacher evaluators in the Beaverton and Everett School Districts included:

Jim Pringle
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Cascade High School
Cascade High School
Cascade High School
Everett High School
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Beaverton School District #48
William Walker Elementary
West Tualatin View Elementary
William Walker Elementary
Five Oaks Middle School
Aloha Park Elementary
Mountain View Middle School
West Tualatin View Elementary
Aloha High School
William Walker Elementary
Mountain View Middle School
Aloha High School
Five Oaks Junior High School
Beaverton School District #48
Five Oaks Middle School
Five Oaks Middle School

The final step in development, Phase IV, began in September, 1976. Under the direction of Dan Grimes, EME Oregon Coordinator, and Duane Altig, Parkrose School District, each Learning Activity Package was examined and revised based upon the field test evaluation. Production assistance was provided by Darlene McLaughlin, Sharon Scherner, Jane Aldrich, G. Sue McCormack, Bill Edwards, Rhea Zaldain, Marie Sullivan, Evelyn Ekstrand, Al Hughes, Mary Linton, and Linda Hileman.

Many persons not specifically named here contributed personally to the success of this major undertaking. Among those not already mentioned were Helen White, Diane Neison, Luanne Campbell, Marcia Whitelock, and Doris Graffam. To those teachers, students, curriculum specialists and parents who remain unnamed but gave so freely of their time and skill, we extend our sincere appreciation. We hope our effort will materially benefit our teaching colleagues.

John C. Jones, D.Ed.
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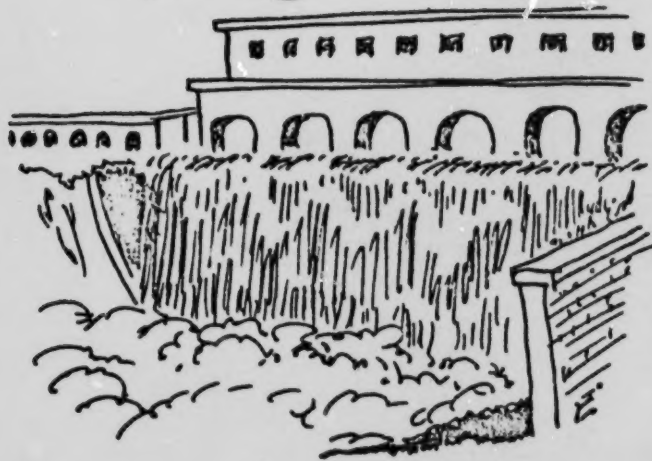


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 - 1. Sources
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 - 4. Impacts
 - 5. Limits
 - 6. Future

III. LEARNING ACTIVITIES

Section One — Sources

Goal:

It is essential that each person know that there are many sources of energy.

Section Two — Uses

Goal:

It is essential that each person know that people are dependent upon energy.

Section Three — Conversion

Goal:

It is essential that each person know that energy can be converted from one form to another.

Section Four — Impacts

Goal:

It is essential that each person know how humankind's use of energy creates an impact on the environmental and economic systems.

Section Five — Limits

Goal:

It is essential that each person know that the earth's resources are limited.

Section Six — Future

Goal:

It is essential that each person know that new energy sources and more efficient systems, accompanied by different consumption practices, may alter the world energy dilemma.

IV. STUDENT ASSESSMENT

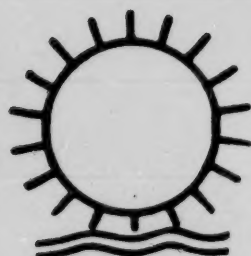
- A. Using The Suggested Test Items
- B. Origin Of Test Items
- C. Types Of Suggested Test Items
- D. Sample Test Items

IMPLEMENTATION HANDBOOK

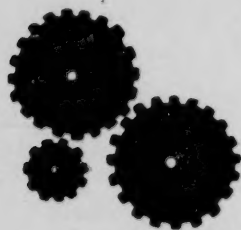
ENERGY AND CONSERVATION EDUCATION

Activities for the Classroom

Grades 1-3



SOURCES



USES



CONVERSIONS



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FUTURE



LIMITS

ACTIVITY NOTEBOOK
IMPLEMENTATION HANDBOOK

Overview

Energy & Man's Environment (EME) is a unique educational program developed to prepare instructional materials dealing with energy education--primary grades through high school. EME was initiated in 1972 by the Public Power Council of the Northwest Public Power Association in cooperation with leading educators in the region. In 1973, members of the Northwest Electric Light & Power Association (NELPA) joined the program. In 1976, additional business, governmental and educational agencies joined the Northwest consortium to strengthen EME efforts. The precedent of cooperative effort has resulted in an educator-directed, non-profit corporation supported by resources from business, government, education, and the private sector. The program has one goal--to make the subject of energy understandable both to the educator and the student. EME's primary concern is to present energy-related issues from all points of view accurately and objectively. EME offers conferences, workshops, seminars, speakers, and special programs to meet the energy-related needs of educators. Each activity can be "custom tailored" to meet the specific needs and interest of the participants.

The educational materials presented in the EME Activity Notebooks 1-12 are an example of the teacher-prepared materials offered by EME for use by classroom teachers in presenting energy-related issues.



Organization

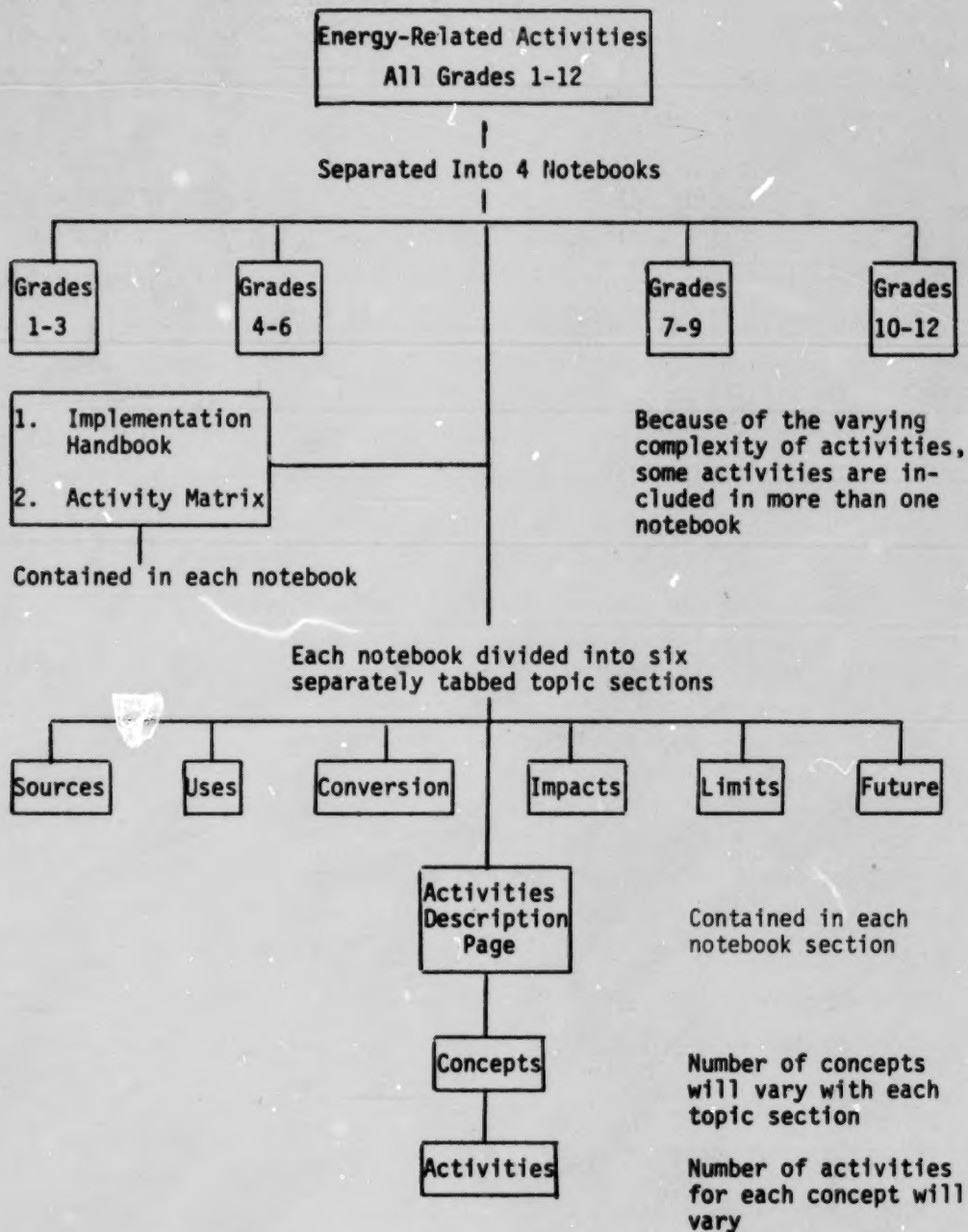
There are four notebooks covering all grade levels 1-12. The arrangement of the notebooks are (1-3), (4-6), (7-9), (10-12). Because of the varying complexity and multidisciplinary nature of the activities, each notebook includes an implementation handbook and an activities matrix which identifies topics, activities, grade levels, subject matter areas, etc. for quick reference by the teacher. The individual notebooks contain activity description pages for each of the six topics in the notebook.

The six principal sections or topics in each notebook are: Sources of Energy, Uses of Energy, Conversion of Energy, Impacts of Energy, Limits of Energy, and Future Sources of Energy. Each topic contains a number of concepts which are necessary to a fundamental understanding of the general topic area. Listed under each concept are simply stated objectives or activities which are multidisciplinary in nature and vary in their complexity. Included within each of the activities is a complete breakdown as to the time needed for implementation of the materials, implementation procedures, assessment procedures, a suggested career education activity, and other information necessary for successful classroom use of the activities.

The following diagram will help to explain the notebook organization. The concepts which provide an overall guide to the intent of the main topic are within the description pages of the notebook. The activity objectives indicate the expected level of outcome from the materials to be presented in the classroom. Each activity is the "hands-on" experience which the student will accomplish to meet the expected outcome.



EME ACTIVITY NOTEBOOK ORGANIZATION



Contained in each notebook section

Teacher Implementation

The materials are designed to be used by classroom teachers in all grade levels. It is hoped that the instructors will feel free to alter, adapt, or change the activities to meet their own particular classroom needs and the needs of their students.

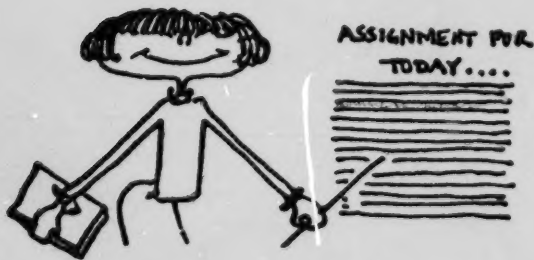
Some of the skills and concepts in the activities should be presented more than once to any given group of students. Therefore, in some instances, it may be desirable to repeat the activity at another grade level--either in its original or in an altered form.

Most of the activities require the students to be actively involved, both with other students and in actual use of the materials. This may require some adjustment of the traditional classroom situation.

There are many activities which contain handouts that can be duplicated for student use.

The actual use of the notebooks is relatively simple. Steps to locating a suitable activity are:

1. Select appropriate notebook.
2. Read activities matrix to select an activity title and number which most closely matches your interest, grade level, and subject matter.
3. Turn to the topic section of the notebook indicated by the activities matrix.
4. Read the description of the activity you selected, and then turn to the activity number in the notebook.
5. Read the activity.
6. Complete the activity. (Repeat these steps for additional activities.)



Assessment

Included in each notebook are a series of sample test items for the teacher who wishes to pinpoint areas of weakness and strength in the individual student's knowledge of energy topics.

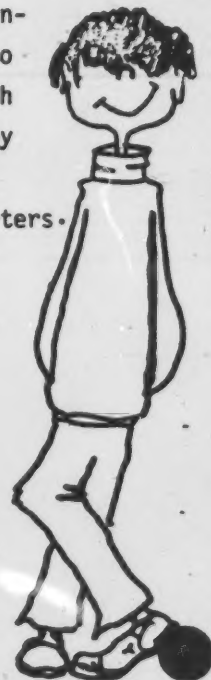
The test items are written so as to be easily understood by a majority of students. The sample questions are not definitive items and are not intended to be the final word on the materials in the notebook. Each of the activities has its own assessment procedures and these should also be utilized by the instructor. The test items may be used as an indicator of the general skill and knowledge level of students prior to the implementation of EME Lesson Plan Notebooks, or as a check on the retention level of students who have been presented materials from the EME Lesson Plan Notebooks. It is recommended that the teacher remain the ultimate judge as to the effectiveness of the activities as they are presented to the students, either in their original or instructor-altered form.

Follow-Up

The materials contained in the notebooks are continually undergoing extensive field testing and revisions to obtain the best possible materials to present to students. In the event that you, as a classroom teacher, wish to contribute more to the program of energy education, EME would be happy to hear from you. If you have any suggestions which could improve any phase of the organization, activities, etc., please contact EME headquarters.

Duane K. Altig

WARNING: SOME OF THE ACTIVITIES IN THIS NOTEBOOK ARE POTENTIALLY HAZARDOUS, DUE TO THE USE OF FLAMMABLE SUBSTANCES AND/OR HEAT. PLEASE EXERCISE EXTREME CAUTION. CHECK YOUR LOCAL AND STATE LAWS GOVERNING THE USE OF FLAMMABLE MATERIALS IN THE CLASSROOM.

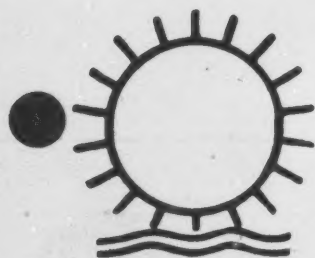


ACTIVITY/SUBJECT MATTER
MATRIX

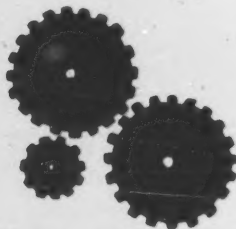
ENERGY AND
CONSERVATION
EDUCATION

Activities for the Classroom

Grades 1-3



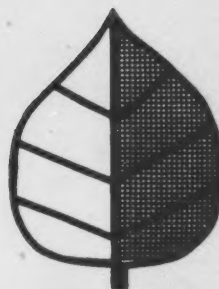
SOURCES



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ACTIVITY/SUBJECT MATTER MATRIX

SOURCES (1-3)

Activity #	ACTIVITY TITLE	Grade Level	Time In 30 Min. Class Per.	SUBJECT MATTER AREAS						
				Math	Lang. Arts	Science	Soc. Studies	Art	Career Aware- ness	
1	"Energy Talk"	1-2	2		X				X	
2	"Let's Learn About Different Energy Sources"	1-2	6-10		X	X		X	X	
3	"Drawing Relay"	1-3	1		X			X	X	
4	"Using My Senses"	3	11			X	X	X	X	
5	"Questioning 'Yes or No?'"	1-3	1		X				X	
6	"Sources Of Energy Coloring Book"	2-3	6		X	X		X	X	
						15				

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ACTIVITY/SUBJECT MATTER MATRIX
USES (1-3)

Activity #	ACTIVITY TITLE	Grade Level	Time In 30 Min. Class Per.	SUBJECT MATTER AREAS						
				Math	Lang. Arts	Science	Soc. Studies	Art	Career Aware- ness	
1	"Something Useless"	1-3	Less		X				X	
2	"Energy Trip Ticket Game"	2-3	3		X	X		X	X	
3	"Electric Appliances Save Time, But How About Energy?"	2-3	4			X		X	X	
4	"Subject and Predicate Cards 'Mix and Match'"	1-2	1		X				X	
5	"The Pencil Tree"	2-3	1			X	X		X	
6	"Energy - How Do We Use It?"	3	4			X	X		X	
7	"Fuelish, the Energy User"	2-3	Var.		X	X			X	

Less = Less than 5 minutes
Var. = variable

INDEX
ACTIVITY/SUBJECT MATTER MATRIX
USES (1-3) (continued)

Activity #	ACTIVITY TITLE	Grade Level	Time In 30 Min. Class Per.	SUBJECT MATTER AREAS					
				Math	Lang. Arts	Science	Soc. Studies	Art	Career Aware- ness
8	"Electrical Energy Pig?--Not Me!"	2-3	8		X	X		X	X
9	"How Plants Grow"	1-2	3			X		X	X
10	"The Apple Factory"	1-2	2			X			X
11	"Six Life Roles and a Mini-Community"	1-3	Sev.	X	X	X	X	X	X
12	"Things I Like To Do"	1-3	1				X		X

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ACTIVITY/SUBJECT MATTER MATRIX
CONVERSION (1-3)

Activity #	ACTIVITY TITLE	Grade Level	Time In 30 Min. Class Per.	SUBJECT MATTER AREAS					
				Math	Lang. Arts	Science	Soc. Studies	Art	Career Aware- ness
1	"Growing A Plant"	1-3	Sev.			X		X	X
2	"Water To Steam"	1-3	2			X	X		X
3	"A Bright Idea"	2-3	2			X			X
4	"Food - Energy and You"	3	7	X		X			X
5	"Walk or Ride?"	3	2	X		X			X
6	"A Hot Idea!"	2-3	2			X			X
7	"About Heat and Light"	1-3	2			X			X

Sev. = Several sessions

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ACTIVITY/SUBJECT MATTER MATRIX
IMPACTS (1-3)

Activity #	ACTIVITY TITLE	Grade Level	Time In 30 Min. Class Per.	SUBJECT MATTER AREAS					
				Math	Lang. Arts	Science	Soc. Studies	Art	Career Aware- ness
1	"Cleanbee!"	1-2	Sev.			X	X	X	X
2	"What Is Energy?"	1-3	10			X			X
3	"Water Pollution"	1-2	2			X			X
4	"Your Nose Knows!"	1-3	3			X			X
5	"Every Litter Bit Helps"	2-3	2			X			X
6	"Litter Bug"	2-3	Sev.		X		X	X	X
7	"You and Noise Pollution"	3	8			X	X		X

Sev. = Several sessions

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ACTIVITY/SUBJECT MATTER MATRIX
IMPACTS (1-3) (continued)

Activity #	ACTIVITY TITLE	Grade Level	Time In 30 Min. Class Per.	SUBJECT MATTER AREAS					
				Math	Lang. Arts	Science	Soc. Studies	Art	Career Aware- ness
8	"A Tour of The Neighborhood"	1-3	3				X		X
9	"Physical Environment Collage"	1-2	2					X	X
10	"Physical Environment Occupations"	2-3	2		X				X
11	"Ways We Use and Save Energy"	3	Sev.			X			X
12	"The Kool-Aid Stand"	3	4			X	X		X
13- 25	"Recycling Stories and Activities"	1-2	Sev.	X	X	X	X	X	X

Sev. = Several sessions

INDEX
ACTIVITY/SUBJECT MATTER MATRIX
LIMITS (1-3)

Activity #	ACTIVITY TITLE	Grade Level	Time In 30 Min. Class Per.	SUBJECT MATTER AREAS					
				Math	Lang. Arts	Science	Soc. Studies	Art	Career Aware- ness
1	"A Letter To Roy The Oil Boy"	2-3	5		X				X
2	"Water - A Most Precious Resource"	3	2			X		X	X
3	"My Story About Coal"	3	4		X				X
4	"How Long Will It Last?"	1-2	7			X			X
5	"What Could You Do Without?"	1-2	2		X			X	X
6	"The Generous Garbage Collector"	1-2	2			X	X		X

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ACTIVITY/SUBJECT MATTER MATRIX
FUTURE (1-3)

Activity #	ACTIVITY TITLE	Grade Level	Time In 30 Min. Class Per.	SUBJECT MATTER AREAS					
				Math	Lang. Arts	Science	Soc. Studies	Art	Career Aware- ness
1	"Conserve Today For Tomorrow"	1-3	2			X		X	X
2	"Something That Lasts"	1-3	2		X				X

SOURCES OF ENERGY

GOAL:

IT IS ESSENTIAL THAT EACH
PERSON KNOW THAT THERE ARE
MANY SOURCES OF ENERGY.



ACTIVITY
DESCRIPTION PAGE
SOURCES (1-3)

GOAL: It is essential that each person know that there are many sources of energy.

Concept: Each form of energy can be used in many ways.

Activity #1 "Energy Talk"

Grade level 1-2 Time: 2 - 30 minute sessions
Language Arts (communication)

Given the opportunity to ask questions about energy uses, the student will be able to identify energy sources.

Concept: Energy is the capacity to do work and is subject to natural laws.

Activity #2 "Let's Learn About Different Energy Sources!"

Grade level 1-2 Time: 6-10 30 minute sessions
Science, Reading, Art

When given visual and audio-visual materials, the student will be able to identify at least four (4) energy sources through sensory experiences.

Concept: Energy sources are unevenly distributed around the earth.

Activity #3 "Drawing Relay"

Grade level 1-3 Time: 1 - 30 minute session
Language Arts, (communication) Arts

Given the opportunity to participate in a drawing relay, the student will be able to identify energy sources.

Activity #4 "Using My Senses"

Grade level 3 Time: 11 - 30 minute sessions
Art, Social Studies, Science

Given the opportunity, the student will become familiar with some common sources of energy and where they are found.

Activity #5 "Questioning 'Yes or No?'"

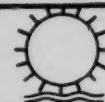
Grade level 1-3 Time: 1 - 30 minute session
Language Arts

Given the opportunity, the student will be able to use the inquiry process as one technique for obtaining data about energy sources.

title: "Energy Talk"



sources



concept: Each form of energy can be used in many ways.

objective: Given the opportunity to ask questions about energy uses, the student will be able to identify energy sources.

time: 2 - 30 minute sessions

subject matter area: Language Arts (communication)

grade: 1-2

implementation:

-This activity is played much like "20 questions" game. The teacher will bring to class for display a sample of gasoline-coal-water-oil-food-wind (a balloon of air)-and wood.

-Discuss with the class how each of these energy sources is used by filling in the chart when students give a suggestion.

Example:

Gasoline	Coal	Water	Oil	Food	Wind	Wood
Cars	Stoves	Water-wheels	Cars	People	Sail-boats	Stoves
Lawn-mowers	Fact-ories	Dams	Furnaces	Animals	Windmills	Factories Etc.
Trucks	"	"	"	"	"	
Buses	"	"	"	"	"	

WARNING: Gasoline and oil are dangerous substances to use in the classroom. Exercise caution and be advised of local and state laws governing the use of these substances in the classroom.

materials:



Samples of:
Coal
Water
Wind (balloon of air)
Wood
Oil
Gasoline
Food

Coal sample.



Implementation:



(continued) Once the students have been guided through the observation and have listed the uses of each energy source, they should have the background to do the activity "Energy Talk."

1. Select one student to come up to the front of the class and choose an energy source without anyone else knowing. The student tells the teacher which energy source he/she selected.
2. Have classmates ask questions that can be answered by yes or no about the energy source. The questions can reflect how the source is used and how it is described, (example: Is it used in cars? Is it black? Is it burned in a stove? etc.)
3. After at least 10 questions have been asked by the group, a student may choose to pick up a source of energy and ask "Is it _____ (name of source). If the student is not correct, the questioning may continue or another student may attempt to identify the tool. Once a student has attempted to identify an energy source and is not correct, he/she has to wait until the next ROUND is played. If he/she is correct they become the leader of the next ROUND.

Optional Activities: At another time have a student present one of the energy sources to the class explaining how it is used.

SUGGESTED CAREER AWARENESS ACTIVITY:

Have the students draw a picture of a person using one of the energy sources.

materials:



SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will be able to identify seven (7) sources of energy after observing and discussing them.



Developed by: Dan Grimes
EME

title: "Let's Learn About Different Energy Sources!"



sources



concept: Energy is the capacity to do work and is subject to natural laws.

objective: When given visual and audio-visual materials, the student will be able to identify at least 4 energy sources through sensory experiences.

time: 6-10 30 minute sessions

subject matter area: Science, Reading, Art

grade: 1-2

Implementation:

Activity: Introduction: Tell the students that they will have some lessons about some things that supply us with energy.

Lesson 1. Ask students what they know about energy and how it is used at home and at school. "What do you know about energy?" "Why do we use energy?" List responses simply on a chart, to be used as a language experience chart in Reading. (Students review what is on chart for a reading lesson.)

Lesson 2. Show films - Energy: Ability to Do Work
Spin! Toot! Scoot!
For grade 2 add Up and Down

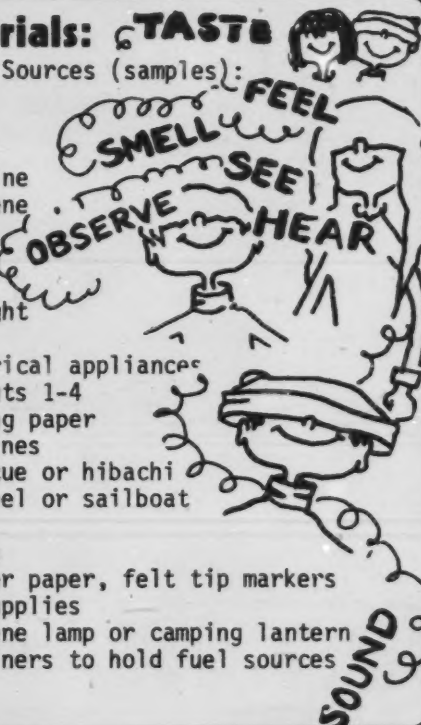
Lesson 3. Use filmstrip "What is Energy?"

Lesson 4. Discuss films and filmstrip; also have students draw pictures showing how energy is used. Continue to add information to the chart(s) used in Lesson 1, as students learn more about energy.

Lesson 5. Using pictures cut from magazines, have students make an energy collage. Show the students sources of energy using the next lesson.
(Grade 1)

materials: **TASTE**
Energy Sources (samples):

Coal
Oil
Gasoline
Kerosene
Water
Wood
Food
Sunlight
Wind
Electrical appliances
Handouts 1-4
Drawing paper
Magazines
Barbecue or hibachi
Pinwheel or sailboat
Fan
Plants
Butcher paper, felt tip markers
Art Supplies
Kerosene lamp or camping lantern
Containers to hold fuel sources



implementation:**Activities:**
(cont.)

Lesson 6.
(Grade 2)
and
Lesson 6.
(Grade 1)

Observation lesson using the senses of touch, smell, and sight. The teacher needs to assemble samples of the following energy sources:

- | | | |
|-------------|------------------|-----------------------|
| 1. coal | 5. falling water | 8. food |
| 2. oil | (faucet) | 9. wind (fan; outdoor |
| 3. gasoline | 6. wood | wind) |
| 4. kerosene | 7. sunlight | 10. electricity |

During this activity have students compare samples in terms of texture, smell, size, color, other qualities. Ask students how they are alike? How different?

For grade 1 see Handout #1 - a coloring page

For grade 2 see Handout #2 - a suggested chart on which to record student responses.

When all student information is recorded on the chart discuss these energy sources. Explain that they are samples of things used by man as a source of power to run machines, heat buildings and to provide food from humans and other animals, (Last of grade 1 lessons.)

Lesson 6.
(Grade 2)

How are the energy sources examined in Lesson 5 used to release energy? Refer to Handout #3 -- a chart of uses. For example, ask "How do people use coal?" List student responses on the chart; discuss comments or questions.

Have the students make an energy collage, using illustrations cut from magazines.

- * Oil, gasoline, and kerosene are dangerous substances to use in the classroom. Exercise caution and be advised of local and state laws governing the use of the substances in the classroom.

materials:**Films:**

Energy and Power primary 10 min. color
Altschul Journal, 1962 (Force & Energy)

Energy: Ability To Do Work 11 min. color
primary CAHILL, 1968

Spin! Toot! Scoot! 14 min color, MM, 1970

We Use Power 11 min color, Churchill, 1956

Up and Down 8 min color primary, BFA,

Filmstrip:

"What is Energy?" 1 col FS 6 Books KT
Benefic Press, 1962

Books:

Energy - Moore, Jordan

Energy & Power - Camp

The First Book of Energy - Harrison,
George R.

The True Book of Power and Energy -
Podendorf, Illa

Water at Work - Meyer, Jerome S., 1963

Oil, USA - Jacobs, Lou Jr., 1967, Elk
Grove Press

Deep Treasure: A Story of Oil - Olds, Liz
1958

The Oilmen - Parker, Charles, 1952

implementation:**Activities:**
(cont.)

Lesson 7-9. The teacher demonstrates to pupils some of the energy which may be released from various energy sources, asking the students to use all their senses in recording their observations. See Handout #4 - a chart for recording their observations. Remind students that the energy from a source might take the form of heat, light, noise, movement, or growth of living things.

1. Coal (charcoal may be used). The teacher should set up a barbecue or hibachi outdoors; ignite charcoal; when it is burning have students observe its appearance, the heat released, and the ashes remaining.
2. Oil. If your school has an oil furnace ask the custodian to take the children on a tour of the furnace room. Some students may also live in homes heated by oil burners and might make limited observations under parental supervision.

Some schools may have other furnace systems which could also be the destination of an in-house "field trip" with the custodian as tour director.
3. Kerosene (using a camping lantern or an old lamp). Bring a lantern or lamp to class, show how it works; observe forms in which energy is released.
4. Sunlight.
 - a. Have students record, from experience and from indirect observation, the amount of heat and light released by the sun.
 - b. Grow plants in containers; when well established put several in a dark place for at least a week (watering as needed). Keep the remainder in good light conditions. After a week or two has elapsed compare the two sets of plants. Discuss the need of plants for light energy.

materials:**equipment:**

16 mm projector
film strip projector



Implementation:



- Activities: 5. Food (nutrition). After eating lunch point out that food gives us energy to be active. Without adequate food we would be less active and eventually may become weak or sick. Ask students to compare the feeling of being very hungry with that of being satisfied.
6. Wind. Using a fan, breath, and/or natural wind observe the turnings of a pinwheel. Relate that in this case moving air is the energy source--one also used to move a sailboat.
- Wood. Observation may be made at home, using fireplaces where available; at school, with the assistance of the custodian, if the school has a means of burning wood or sawdust; or, in some instances, at a bonfire or beachfire, as on a family camping trip. Discuss the energy released from wood.
8. Electricity. Using a wall outlet, demonstrate to students the heat released from an iron or a hot plate, light from light bulbs, the custodian's vacuum cleaner, and a food (hand) mixer. Using battery power demonstrate a flashlight and a toy being operated.

Show the films Energy and Power and We Use Power.

SUGGESTED CAREER AWARENESS ACTIVITY:

Students could draw pictures of people doing jobs that require the use of different energy sources.



materials:



SUGGESTED ASSESSMENT PROCEDURE:

By the end of this unit, the student should have a better understanding of what energy is, the names of energy sources and how they can be used by people.

The teacher should base his/her evaluation of the student's progress on the art work, discussions, charts, and demonstrations conducted in class.

The teacher can also prepare an oral or written test of questions for students to answer. (example)

1. Name as many energy sources as you can.
2. How do we use energy?
3. What does energy do?

Note: The teacher should feel free to use the unit as he/she sees fit for a class situation. The unit could be used effectively in part or by using all the suggested activities.

Developed by: Dan Grimes
EME

Sources of Energy

Name _____



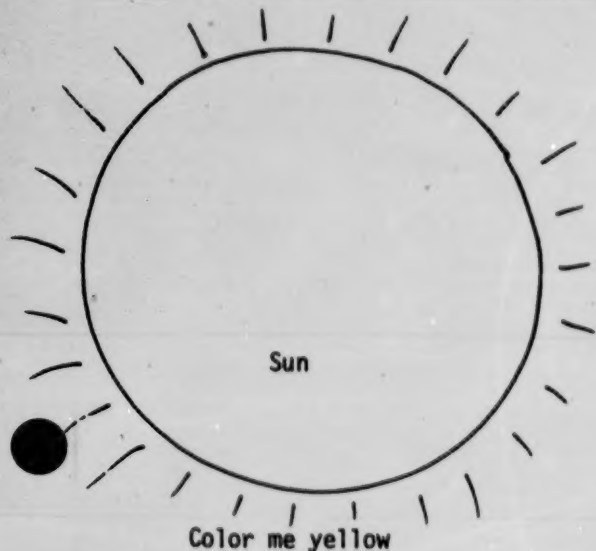
Color Me

Hi boys and girls.

I am Mr. Energy.

Can you color my friends?

Try Hard!



Coal

Color me black

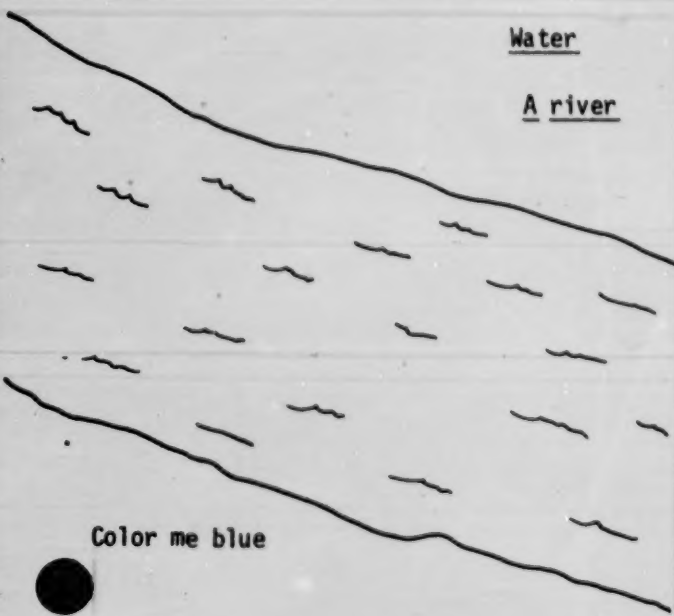


Food

Color me red

Water

A river



Color me blue



Color me
black

Oil



Handout #2

SOURCES OF ENERGY

List student responses
on chart.

Observations	coal	oil	sunlight	gasoline	kerosene	water	food	wind
Seeing								
Feeling Touching								
Smelling								

Some of the senses cannot be used for observation of the sources. Discuss why with students.



activities



Handout #3

HOW SOURCES OF ENERGY ARE USED

List student responses
on chart. Discuss.

	coal	sunlight	oil	gasoline	kerosene	running water	wood	plants food	wind	electricity
USES BY MAN	trains	plants	cars	cars	lanterns	boats	fires	meals	sail boats	
	stoves	heat	trucks	lawn mower	_____	dams	_____	_____	_____	
	_____	_____	planes	trucks	_____	_____	_____	_____	_____	
	_____	_____	_____	planes	_____	_____	_____	_____	_____	
	_____	_____	_____	_____	_____	_____	_____	_____	_____	

Students should tell how man has used these sources now and in the past. Teacher should feel free to add uses and discuss with students. Also students can ask their parents how these sources are used.



activities



Handout #4

OBSERVATIONS OF WHAT
ENERGY SOURCES GIVE OFF (RELEASE)List student responses
on chart. Discuss.

	coal	wind	wood	sunlight	kerosene	electricity	food	plants growing
Seeing								
Feeling								
Smelling								
Hearing								

Some of the senses cannot be used because of the source. Discuss this with your students.



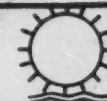
activities



title: "Drawing Relay"



sources



concept: Energy sources are unevenly distributed around the earth.

objective: Given the opportunity to participate in a drawing relay, the student will be able to identify energy sources.

time: 1 - 30 minute session

subject matter area: Language Arts, Art

grade: 1-3

implementation:

1. Arrange the students in groups of five, having them sit on the floor or at tables in various locations in the room.
2. Place one pencil and some paper in the center of each circle.
3. Number the students in each circle from 1 to 5. Seat yourself as far away from the circles of students as you can.
4. When the signal is given, the first student from each circle comes to you. He/she is to come without pencil or paper.
5. Tell each one the name of the first item on the list. (See list provided)
6. Each student returns to his respective circle, takes the pencil in the center and draws (without talking) the item until someone in the circle correctly identifies it using a soft voice.
7. The second person in the circle comes to you and tells you what the group has determined the drawing is.
8. You then give that student a new object to draw.
9. A sample list of items or object follows:

materials:

Construction paper (several sheets)
Pencils
List of energy sources



implementation:

(cont.)

Sun
Steam
Wood
Apple
Wind

Factory Smoke
Trash Collector
Dam
Plant

10. Remind the students that if they yell out what is being drawn, others will hear.

Optional activities: The teacher can make up his/her own list of words for different subjects.

SUGGESTED CAREER AWARENESS ACTIVITY:

Have the students draw a picture of a person working with one of the energy sources used in the activity.

**materials:****SUGGESTED ASSESSMENT PROCEDURE:**

Given the opportunity to communicate by drawing relay, the student will be able to make a picture of an energy source that others can identify.



Developed by: Dan Grimes
EME

title: "Using My Senses"



sources



concept: Energy resources are unevenly distributed around the earth.

objective: Given the opportunity, the student will become familiar with some common sources of energy and where they are found.

time: 11 - 30 minute sessions

subject matter area: Art, Social Studies, Science

grade: 3

implementation:

- Activity:
1. (Lessons 1 and 2) Sensory observations of basic energy sources. The teacher needs to collect samples of the following:

* Coal	Kerosene	Food
Oil	Running water (faucet)	Wind (fan, outside wind)
Gasoline	Wood	Sunlight (hard to collect)

 - a. Have students examine and observe the various samples, comparing them for similarities and differences. Record student observations on a chart like that shown in Hand-out #1.
 - b. Show films: "Energy and Power: A First Look," and "We Use Power."
 2. (Lessons 3 and 4) Show film, "Coal: A Source of Energy," and filmstrip, "The Earth's Resources: Fuel Resources."
 - a. Discuss these, point out that both of these are fossil fuels, mined from within the earth.
 - b. Have students make pictures showing the extraction of fossil fuels.
- * Oil, gasoline and kerosene are dangerous substances to use in the classroom. Exercise caution and be advised of local and state laws governing the use of these substances in the classroom.

materials:



The teacher should use a wide variety of audiovisual materials. Suggested in these lessons are the following:

Films:

"Coal: A Source of Energy," 15 minutes, color, McGraw-Hill 1967.

"Forest Gives Us Wood," 11 minutes, color, U.S. Forest Service, UWF 1965 (Fuel forest reserves).

"The Big Dinner Table," 11 minutes, color, NEW 1968.

"Food Energy and You," 10 minutes, color, NEW 1968.

"Little Bluebird's Valley," 11 minutes, color, COR 1971.

Implementation:

- Activities: 3. (Lesson 5) Show film "The Forest Gives Us Wood."
(cont.)
- Discuss film. Discuss harvesting wood as a source of energy.
 - Have students make pictures depicting the lumbering industry and others showing how wood has been used as a fuel source.
4. (Lessons 6 and 7) Water sources (rivers, streams, dams used with running water).
- Show film, "Little Bluebird's Valley."
- Discuss film, water storage behind dams as an energy source.
 - Next show the film, "Powerline: Transportation of Energy."
- Draw pictures of water as an energy source. Point out that water power is often used in the form of electrical energy, after falling many feet and turning turbines to generate electricity.
5. (Lesson 8) Wind sources Show film, "Wind: A First Film."
- Discuss, after film, man's past and present use of wind as an energy source.
 - Draw pictures showing uses of wind energy.
6. (Lessons 9 and 10) Food: An energy source: All animals, including human beings, are dependent on food for energy to live. Without this energy, which comes directly or indirectly from plants, we would die. Without the sun plants would die.
- Show the films, "The Big Dinner Table," and "Food Energy and You."
- Discuss the sun as the energy source for plants and plants as an energy source for man.
 - Ask how many students would be willing to miss several meals. Why? Point out to students our need for the energy from food to keep ourselves active and healthy.

materials:

(cont.)

Films continued:

"We Use Power," 10 minutes, color
Churchill 1956

"Energy and Power: A First Look," 10
minutes, color Altschul Journal 1962.

"Powerline: Transportation of Energy,"
11 minutes, color, Barr 1971.

"Wind: A First Film," 9 minutes, color
BFA 1966.

Filmstrip:

"The Earth's Resources: Fuel Resources"
McGraw-Hill 1970.

Books:

Water at Work; Meyer, Jerome S. c. 1963.

Oil, USA; Jacobs, Lou Jr. c. 1967, Elk
Grove Press.

Deep Treasure: A Story of Oil; Olds,
Liz c. 1958.

The Oil Men; Parker, Charles c. 1952

implementation:**Activities:**
(cont.)

- c. Draw pictures showing food as an energy source.
7. (Lesson 11) Discuss the sun as a source of energy. Discuss our dependence on the sun for our existence.
 - a. Ask the question, "What would happen if the sun vanished?"
 - b. Have students make drawings depicting the sun as an energy source.
8. Student pictures about energy sources might become part of a mural, made step-wise as each additional source is introduced and discussed. The mural and coloring book which accompanies this unit both illustrate these sources: Coal strip mining, coal underground mining, oil wells, forest, energy from wind, sun, falling water and food.

SUGGESTED CAREER AWARENESS ACTIVITY:

Whenever possible in this unit point out the energy-related jobs people do. Help them find out what the jobs are like.

**materials:****Other Materials:**

Butcher paper
Felt tip markers
Coloring book (attached)
Samples of coal, oil, gasoline, kerosene, water, wood and food.

16mm projector
Filmstrip projector

SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity to view films, examine samples of energy sources and participate in class discussions and art work, the student will demonstrate a familiarity with some common sources of energy and where they are found.

Developed by: Dan Grimes
EME

Handout #1

SOURCES OF ENERGY

List student responses
on chart for discussion.

Observation	coal	oil	gasoline	kerosene	water	wood	food	wind	sunlight
Seeing Color	black		brownish yellowish blueish		color- less		several		
Feeling Texture	rough	slick sticky etc.					several		hot warm
Weight Relative to Size									no weight
Solid Liquid Gas		liquid					solid liquid		
Smell							sweet bitter		
Shape			no shape				several		no shape



activities



SOURCES OF ENERGY



COLORING BOOK

WRITTEN BY DAN GRIMES

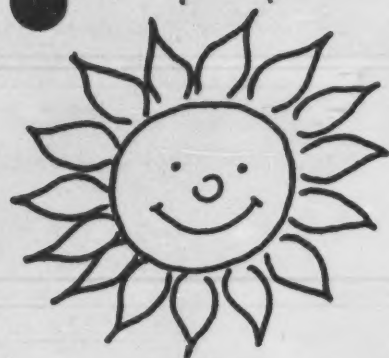
PICTURES BY OMER GOSNELL

Food gives our bodies energy.

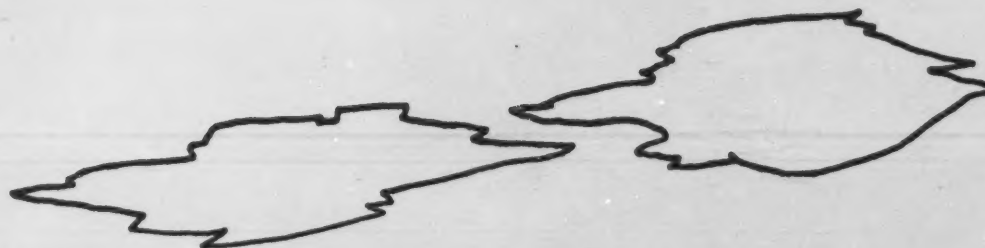
We need energy from food to
keep us healthy and active.



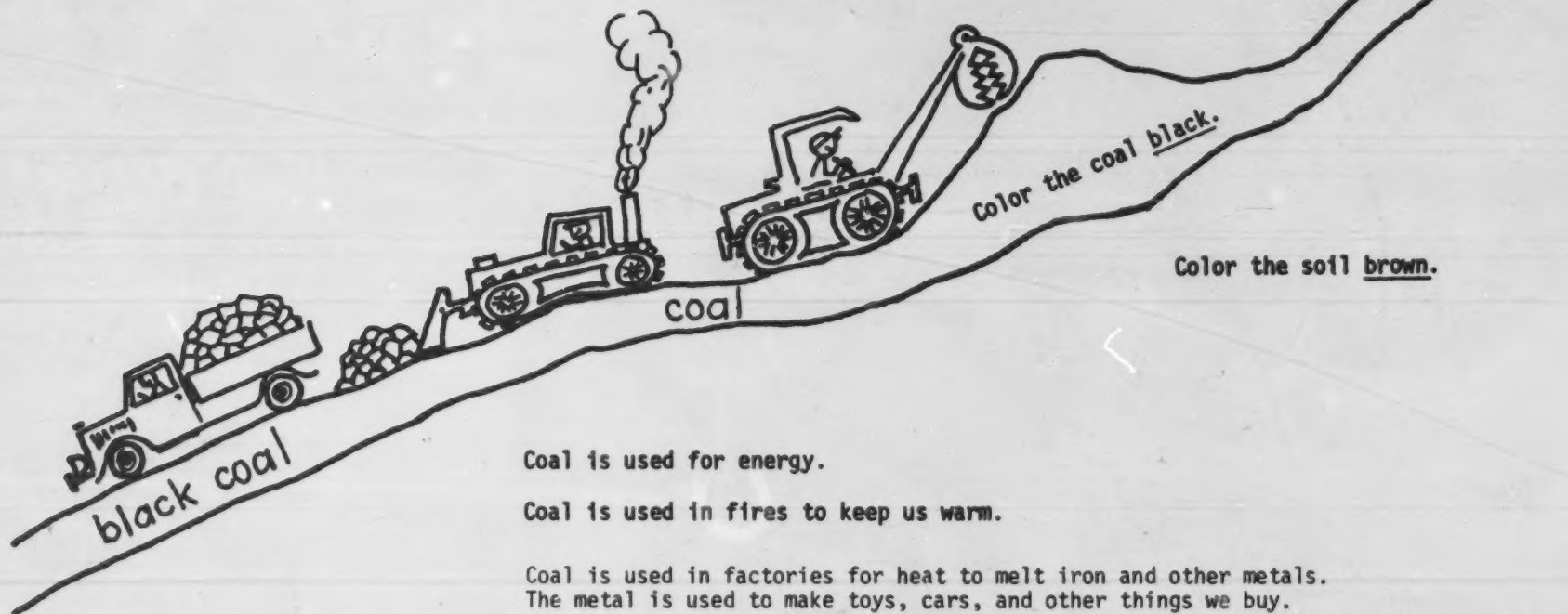
Color the
apple red.



Strip Mining for Coal



Big machines scrape the ground to get the coal. Machines load trucks. The trucks haul the coal to where it is needed.

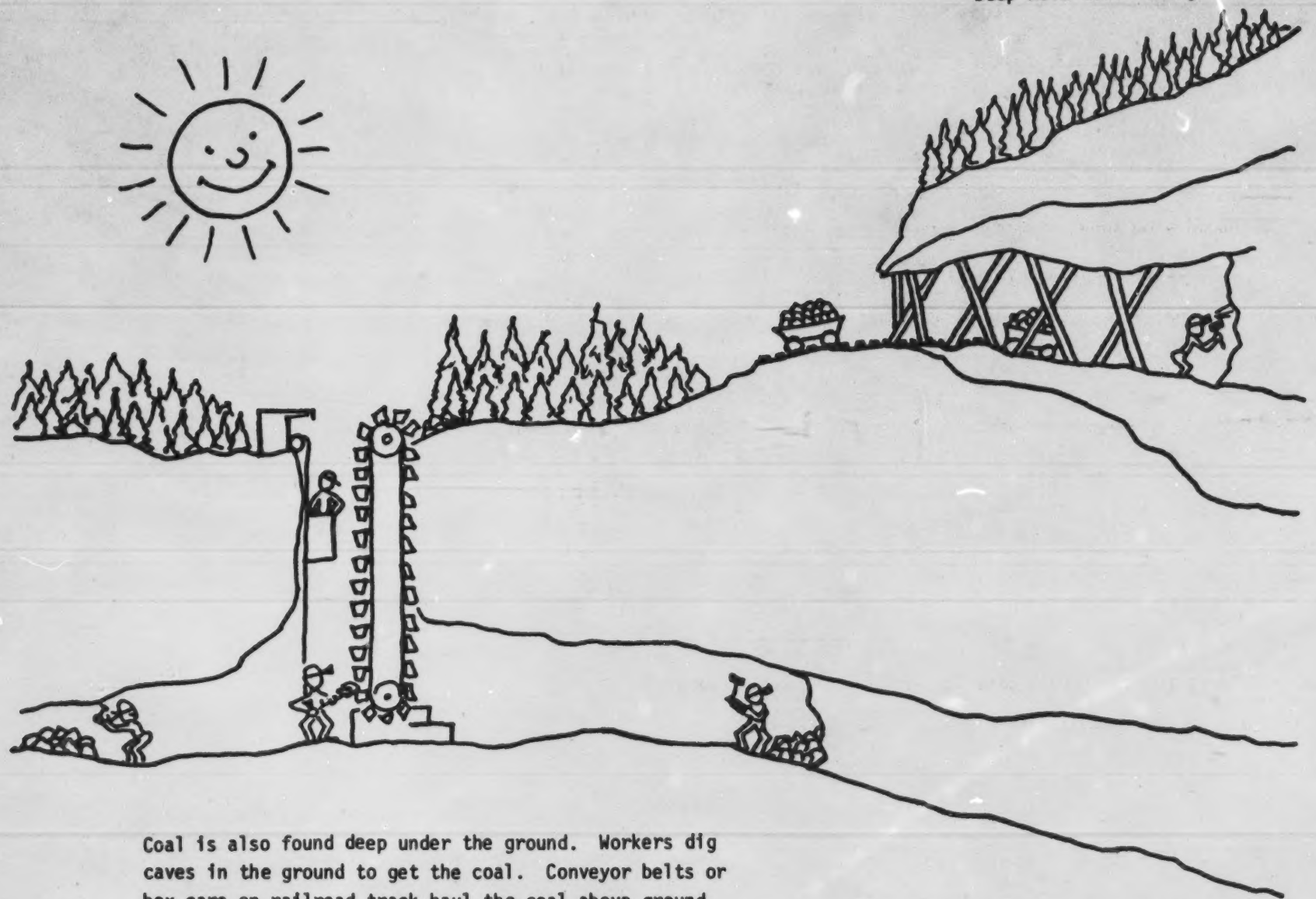


Coal is used for energy.

Coal is used in fires to keep us warm.

Coal is used in factories for heat to melt iron and other metals. The metal is used to make toys, cars, and other things we buy.

Coal is used to make electricity for our homes, schools, streets, factories and stores.



Coal is also found deep under the ground. Workers dig caves in the ground to get the coal. Conveyor belts or box cars on railroad track haul the coal above ground.



Oil is found deep under the ground. Workers drill holes deep under the ground. When they strike oil, the oil is pumped to the top of the ground.



Oil is used for energy.
Oil is used to keep fires burning.
Heat from the fire keeps us warm.
Have you ever heard of an oil stove?

The black, thick oil is called crude oil. The crude oil is taken to a refinery. At the refinery it is made into clean oil, gasoline and kerosene. Many more products are also made from crude oil.



Wood is used for energy.

Wood is used to build fires.

Fires keep people warm and cook
food to eat.



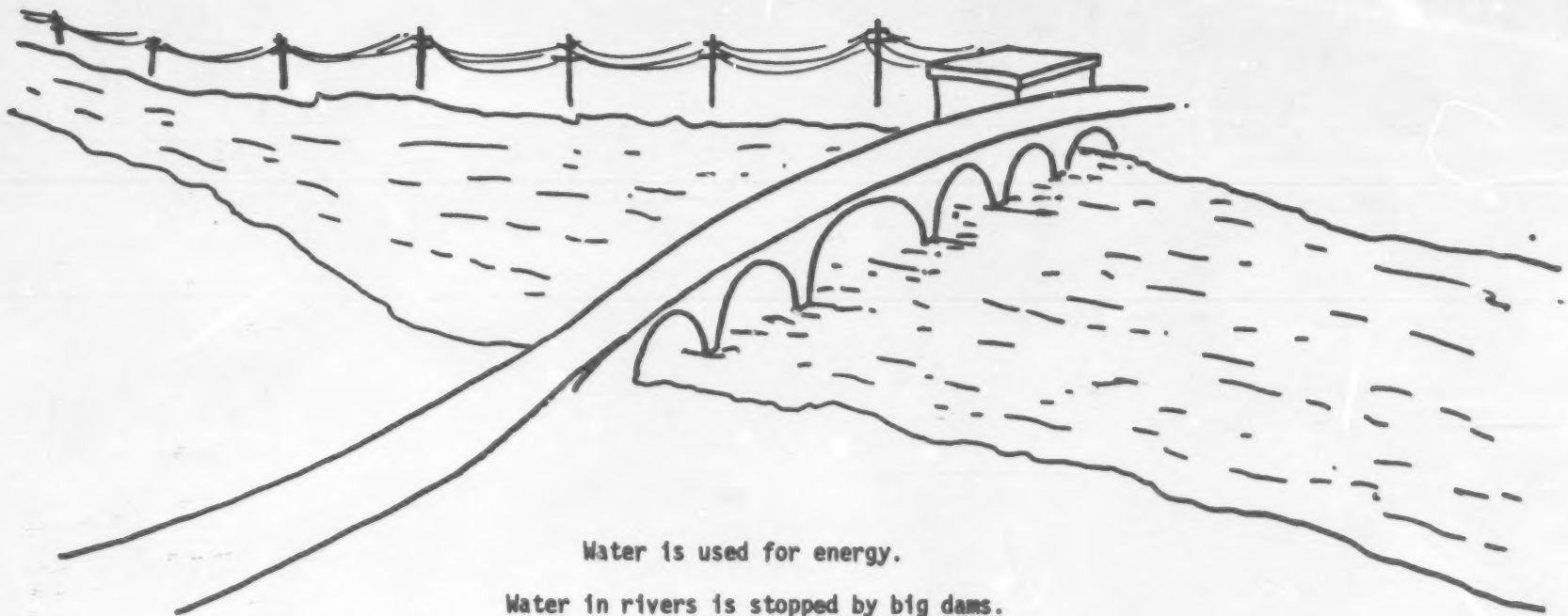
Color the
tree.

Wood comes
from trees.





Energy from Running Water



Water is used for energy.
Water in rivers is stopped by big dams.
Then it is used to make electricity.

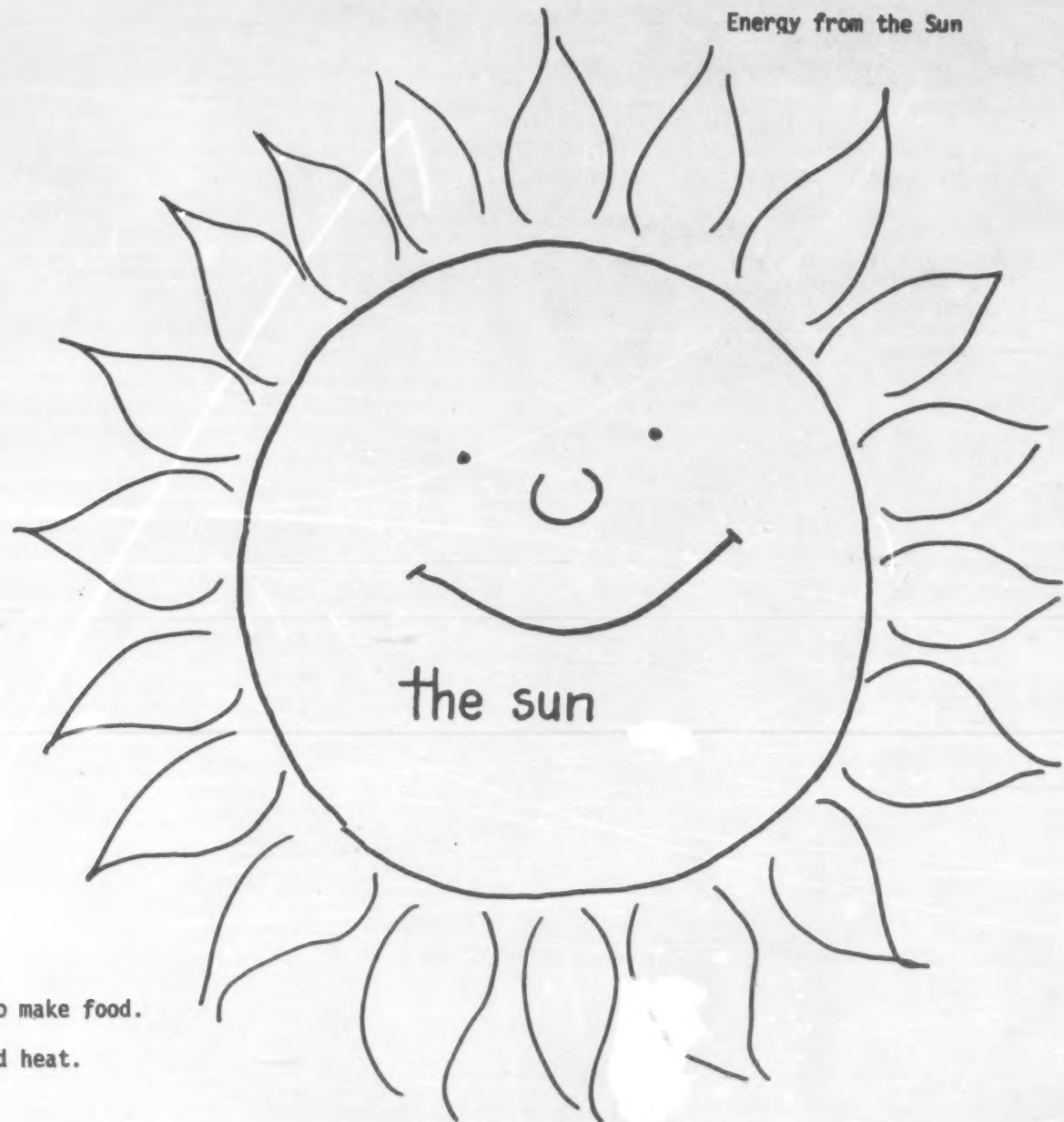
Wind is used for energy.

Wind makes sailboats go.

Wind turns windmills.



Color the sun yellow.



Energy from the Sun

The sun gives plants energy to make food.

The sun gives us light and heat.

title: "Questioning 'Yes or No?'"



sources



concept: Energy sources are unevenly distributed around the earth.

objective: Given the opportunity, the student will be able to use the inquiry process as one technique for obtaining data about energy sources.

time: 1 - 30 minute session

subject matter area: Language Arts

grade: 1-3

implementation:

Statement: This activity can be adapted to any grade level. The process of the activity is the major focus and should be carried out at least three times a week. As students become more skillful, try colors, concepts, words that define concepts, tools, behaviors, feelings, etc.

Procedure: On 3 x 5 cards, write the following energy sources. (One on each card.)

- | | |
|------------------|-----------------|
| 1. Coal | 8. Geothermal |
| 2. Oil | 9. Hydro |
| 3. Sun | 10. Natural Gas |
| 4. Gasoline | 11. Garbage |
| 5. Wood | 12. Wind |
| 6. Nuclear | 13. Plants |
| 7. Ocean Current | |

You can duplicate each source of energy to have enough for a class size of 26.

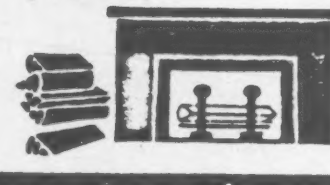
Note: For lower grades: Preview the list of sources and discuss with students before beginning the activity.

materials:



- 1 felt pen
- 3 x 5 cards

Fuelwood Use



implementation:



(continued)

20 minutes: Explain the rules of the simulation.

Rules:

- You may ask questions.
- You may ask only 3 questions per person.
- Questions can be answered with only yes or no.
- If a person has identified their card, then you take it off their back and put it on their front.
- Place the cards on backs of everyone in the room and allow them to ask their questions. If anyone identified their energy source, they are to continue to answer questions for the others.

15 minutes: After 20-30 minutes, stop the activity and have them place their cards on the front and then have them group themselves according to similar energy source. Have each group define why they have grouped themselves in that particular group.

5 minutes: Finalize lesson by answering questions the students may have on how to ask questions to get data for new questions. Prepare them for the session the next day.

Optional Activities: Determine those energy sources that are not located in your local area.

SUGGESTED CAREER AWARENESS ACTIVITY:

As a class, list the energy sources used in your local area and name two occupations that work directly with that source. (e.g.: coal = coal miner.)

materials:



SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity to use inquiry skills, the student will be able to determine the source of energy he/she is trying to find out about.

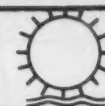
Developed by:

Dan Grimes
EME

title: "Sources of Energy Coloring Book"



sources



concept: Natural processes are constantly forming and concentrating sources of energy.

objective: Given the Sources of Energy Coloring Book to complete, the student will be able to identify and describe a minimum of 4 sources of energy.

time: 6 - 30 minute sessions

subject matter area: Science, Art, Reading

grade: 2-3

implementation:

- Activity:
1. Each day, introduce a new source of energy from the coloring book. Read the story.
 2. Discuss the source and for what it is used in addition to what the story tells.
 3. Color the picture.

SUGGESTED CAREER AWARENESS ACTIVITIES:

1. Discuss the workers involved directly and indirectly with each source (e.g. woodsperson, builder, etc.)
2. Invite any parents who work with any of these sources to speak to the class about his/her job.

materials:

Copy of coloring book for each child.

Crayons



SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will express his/her knowledge of several energy sources in verbal, written or picture form.

Developed by: Dan Grimes
EME

SOURCES

OF ENERGY



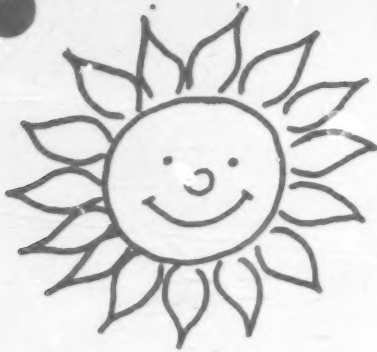
COLORING BOOK

WRITTEN BY DAN GRIMES

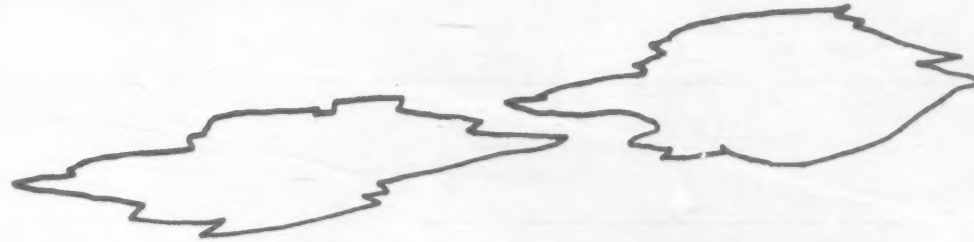
PICTURES BY OMER GOSNELL

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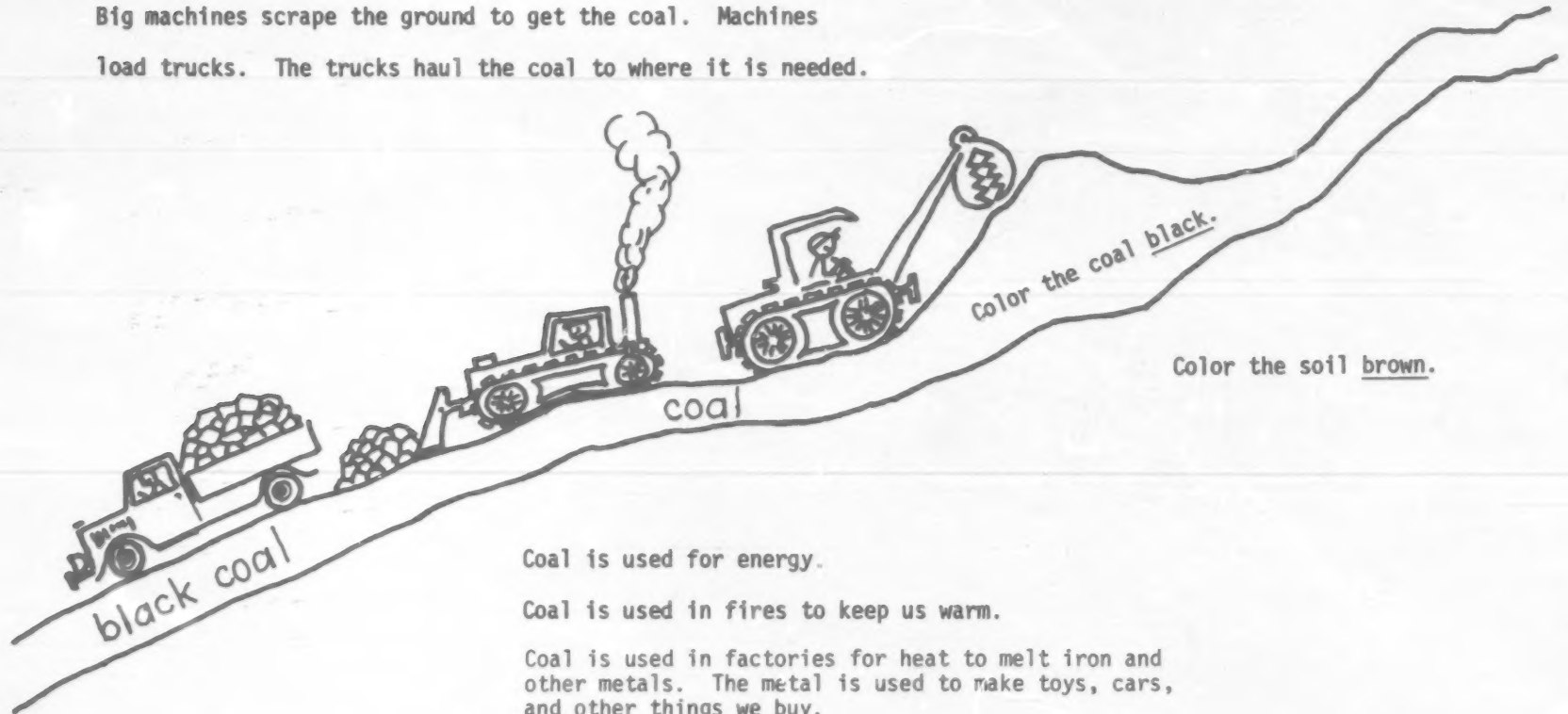
1975



Strip Mining for Coal



Big machines scrape the ground to get the coal. Machines load trucks. The trucks haul the coal to where it is needed.



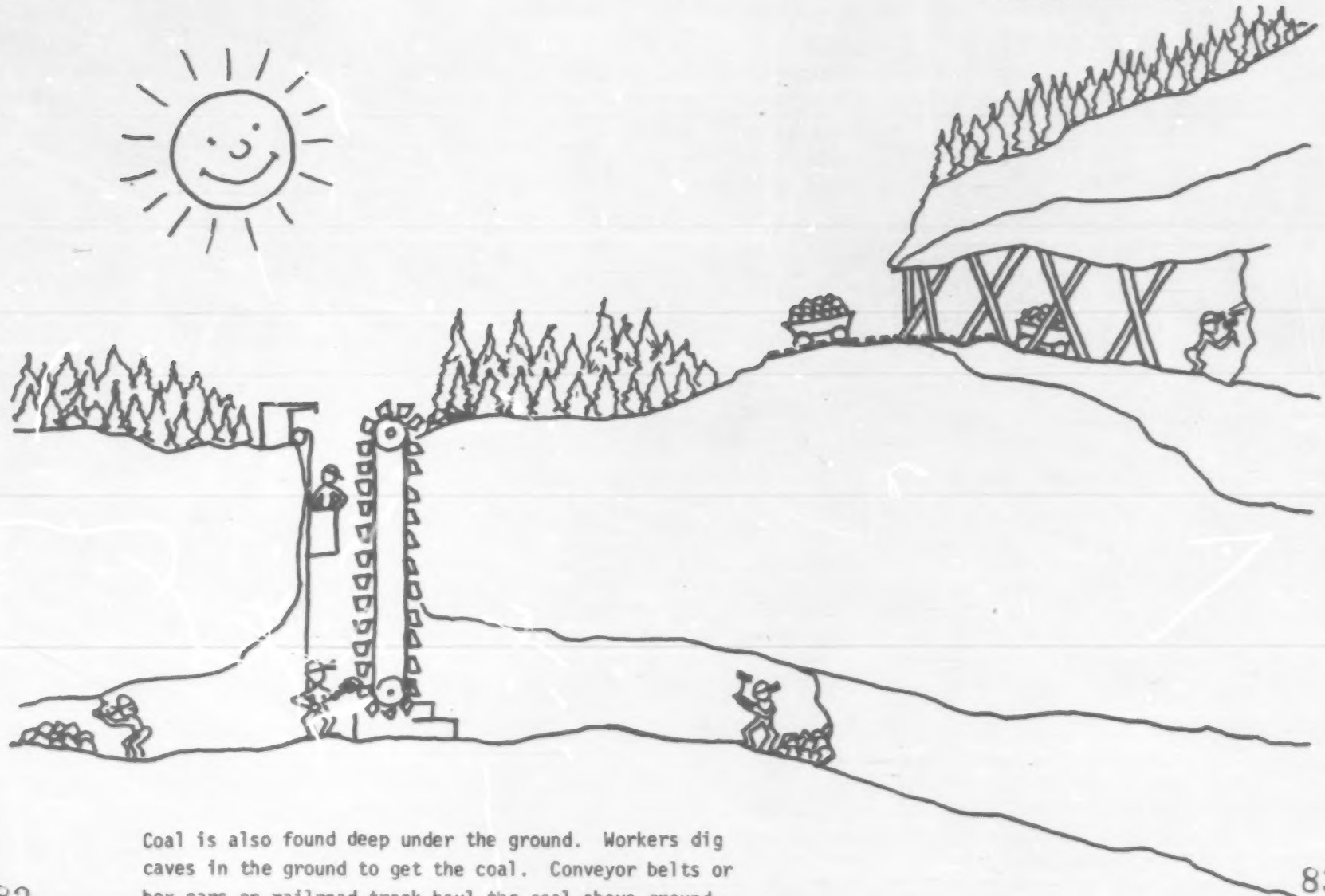
Coal is used for energy.

Coal is used in fires to keep us warm.

Coal is used in factories for heat to melt iron and other metals. The metal is used to make toys, cars, and other things we buy.

Coal is used to make electricity for our homes, schools, streets, factories and stores.

Deep Hole Coal Mining



Coal is also found deep under the ground. Workers dig caves in the ground to get the coal. Conveyor belts or box cars on railroad track haul the coal above ground.



Oil is found deep under the ground. Workers drill holes deep under the ground. When they strike oil, the oil is pumped to the top of the ground.



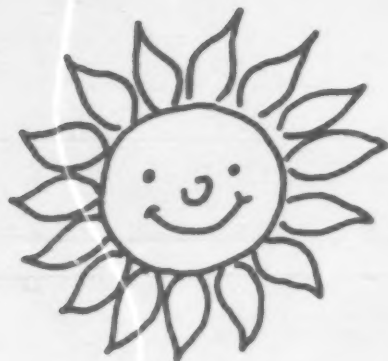
Oil is used for energy.

Oil is used to keep fires burning.

Heat from the fire keeps us warm.

Have you ever heard of an oil stove?

The black, thick oil is called crude oil. The crude oil is taken to a refinery. At the refinery it is made into clean oil, gasoline and kerosene. Many more products are also made from crude oil.



Wood is used for energy.

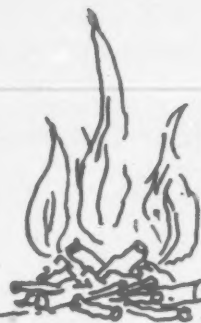
Wood is used to build fires.

Fires keep people warm and cook
food to eat.



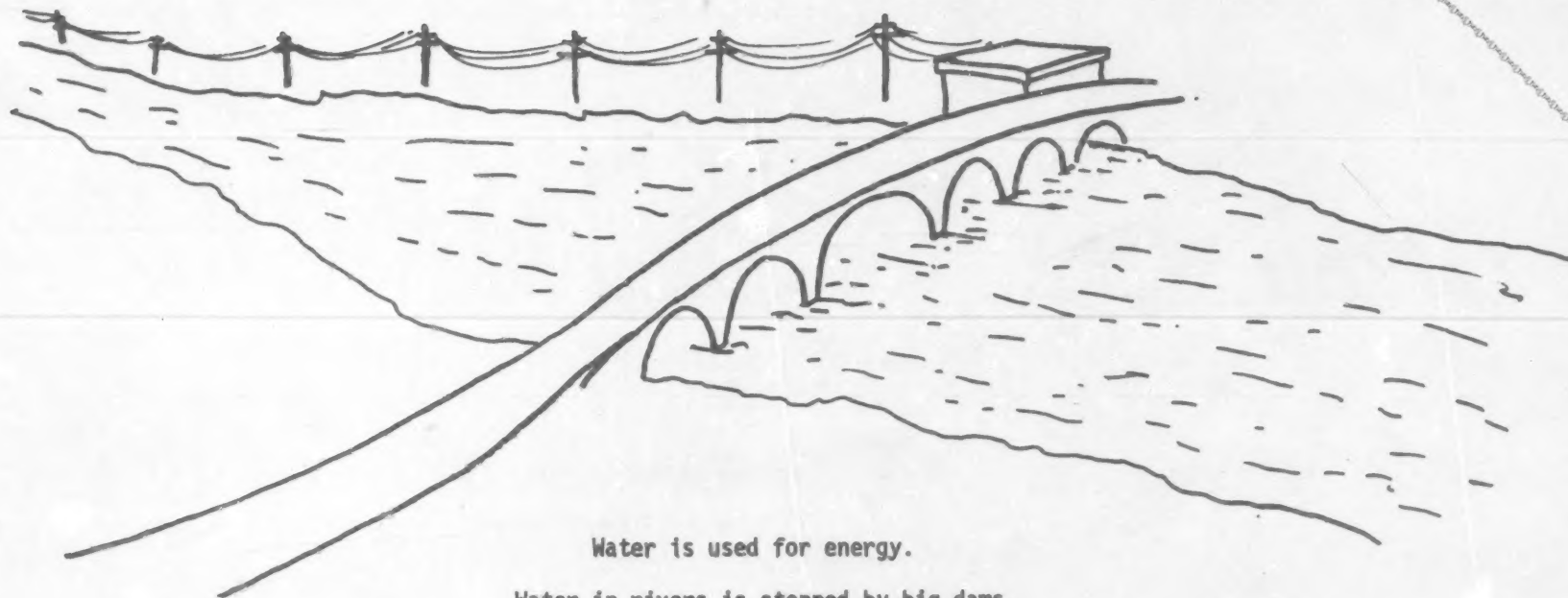
Color the
tree.

Wood comes
from trees.





Energy from Running Water

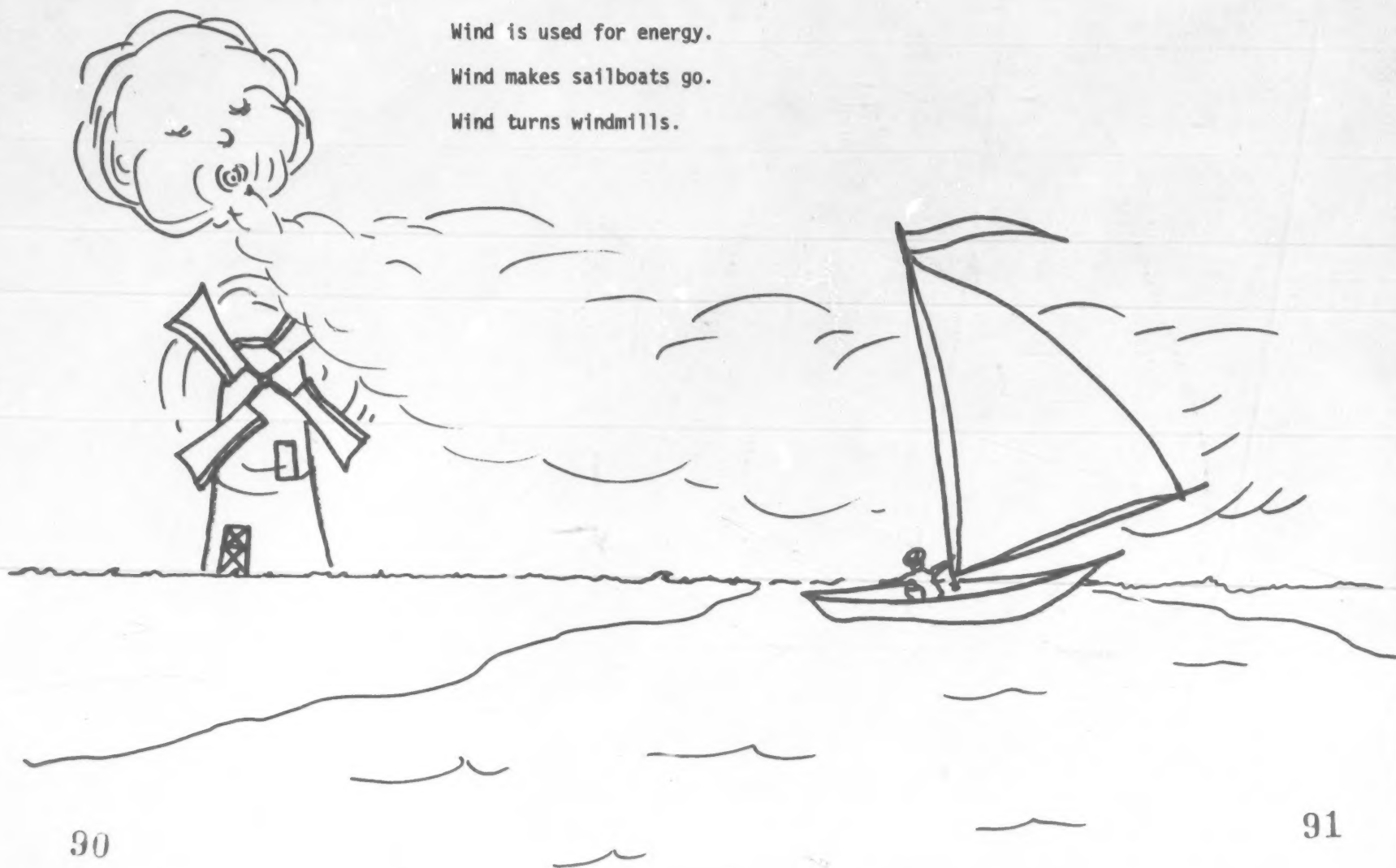


Water is used for energy.
Water in rivers is stopped by big dams.
Then it is used to make electricity.

Wind is used for energy.

Wind makes sailboats go.

Wind turns windmills.



Food gives our bodies energy.
We need energy from food to
keep us healthy and active.



Color the
apple red.

Energy from the Sun

Color the sun yellow.



The sun gives plants energy to make food.

The sun gives us light and heat.

USES OF ENERGY

GOAL:

IT IS ESSENTIAL THAT EACH
PERSON KNOW THAT PEOPLE ARE
DEPENDENT UPON ENERGY.



ACTIVITY
DESCRIPTION PAGE

USES (1-3)

GOAL: It is essential that each person know that people are dependent upon energy.

Concept: There are many ways to conserve energy.

Activity #1 "Something Useless"
Grade level 1-3 Time: Less than 5 minutes
Language Arts (communication)
Given the opportunity, the student will describe ways that "throw-away" products can be re-used or re-cycled.

Concept: Every decision made involving energy affects standards of living.

Activity #2 "Energy Trip Ticket Game"
Grade level 2-3 Time: 3 - 30 sessions
Science, Art, Language Arts
Given the opportunity, the student will be able to recognize that energy conservation affects our standard of living.

Activity #3 "Electric Appliances Save Time, But How About Energy?"
Grade level 2-3 Time: 4 - 30 minute sessions
Science, Art
Given the opportunity, the students will be able to recognize how people use energy in the home to do work that was once done by hand.

Concept: Each form of energy is used in many ways.

Activity #4 "Subject and Predicate Cards 'Mix and Match'"
Grade level 1-2 Time: 1 - 30 minute session
Language Arts
Given the opportunity, the student will be able to gain information about energy use by matching subject phrases with predicate phrases.

Activity #5 "The Pencil Tree"
Grade level 2-3 Time: 1 - 30 minute session
Science, Social Studies
Given the opportunity, the student will draw an energy cycle depicting the making of a pencil.

ACTIVITY
DESCRIPTION PAGE

USES (1-3)

(continued)

- Activity #6 "Energy - How Do We Use It?"
Grade level 3 Time: 4 - 30 minute sessions
Social Studies, Science
Given the opportunity, the student will be able to list ways we use energy in the home and community, and then list conservation measures for those uses.
- Concept: All industrial processes make use of several forms of energy.
- Activity #7 "Fuelish, the Energy User"
Grade level 2-3 Time: "free-time" activity, varies
Science, Reading
Given the opportunity, the student will be able to recognize that we use many forms of energy daily in a great variety of ways.
- Concept: Some human technologies and activities use more energy than others.
- Activity #8 "Electrical Energy Pig? -- Not me!"
Grade level 2-3 Time: 8 - 30 minute sessions
Science, Art, Language Arts
Given the opportunity, the student will be able to better understand responsibilities in conserving electricity after identifying and discussing proper usage of electrical appliances.
- Concept: All living things and natural processes require energy.
- Activity #9 "How Plants Grow"
Grade level 1-2 Time: 3 - 30 minute sessions
Science, Art
Given the opportunity, the student will be able to observe the effect of sun on plants.
- Activity #10 "The Apple Factory"
Grade level 1-2 Time: 2 - 30 minute sessions
Science
Given the opportunity, the student will draw a food chain beginning with the sun and ending with the child.

ACTIVITY
DESCRIPTION PAGE
USES (1-3)

(continued)

Concept: Social, economic, and political pressures influence the efficient and economical use of energy.

Activity #11 "Six Life Roles and a Mini-Community"
Grade level 1-3 Time: Several weeks on-going
All Subject Matter Areas
Given the opportunity, the student will realize that individuals may band together in citizen groups to affect political/social/economic choice.

Concept: Every decision made involving energy affects standards of living.

Activity #12 "Things I Like To Do"
Grade level 1-3 Time: 1 - 30 minute session -
Social studies (values) depending on grade level
Given the opportunity to make a list of things they like to do, the students will be able to examine the items and determine a value for each.

title: "Something Useless"



uses



concept: There are many ways to conserve energy.

objective: Given the opportunity, the student will describe ways that "throw-away" products can be re-used or recycled.

time: Less than 5 minutes

subject matter area: Language Arts - communication

grade: 1-3

implementation:

Activities: The students will describe how various objects can be re-used. Students will try to convince the rest of the class that a used object is useless.

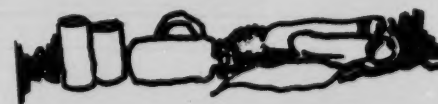
1. Choose a student who is willing to try to convince her/his classmate that an old newspaper is useless (any object will do).
2. Allow the class to respond by disagreeing and giving suggestions for re-using and/or recycling the object.
3. Follow-up with a class discussion about the importance of recycling and re-using products.
4. Encourage the students to find an object at school or home that they could bring to class and present as being useless. Challenge the students in doing this.

Note: This activity can be used to help students become better presenters in front of people.

materials:



Any used object such as an empty can, used newspaper, used paper bag, old toothpaste container, etc...

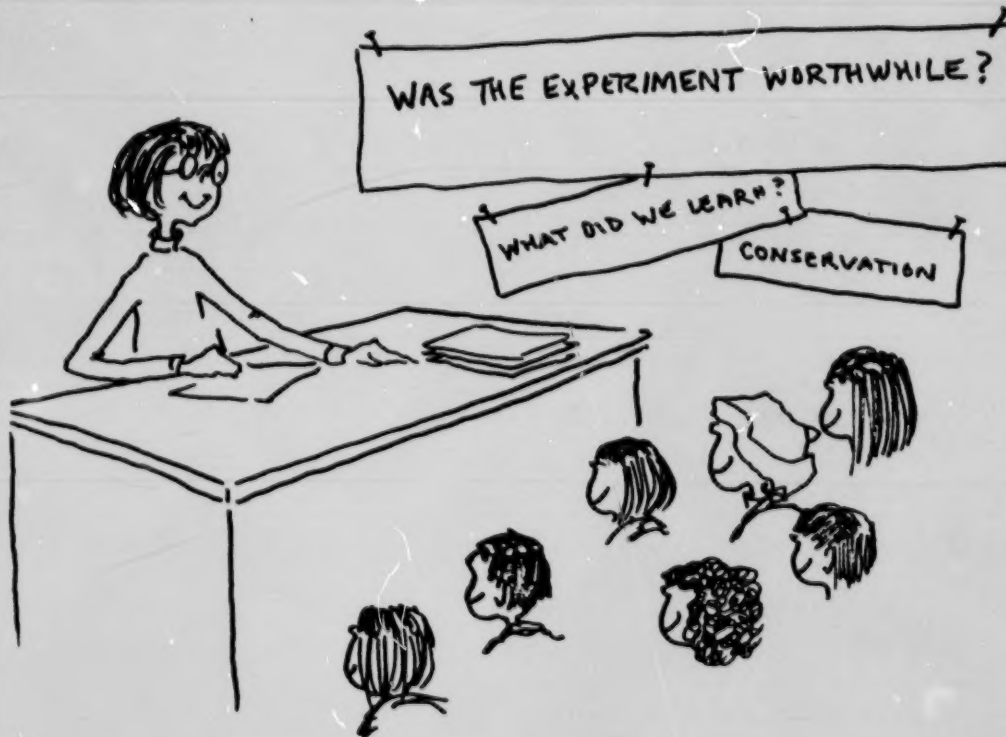


implementation:



SUGGESTED CAREER AWARENESS ACTIVITY:

Invite the local trash collector to class to talk about his/her job and to point out the importance of re-using and recycling products instead of throwing them away.



materials:



SUGGESTED ASSESSMENT PROCEDURE:

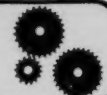
Given the opportunity, the student will be able to share an object with his/her peers and discuss ways it could be re-used or recycled.

Developed by: Dan Grimes
EME

title: "Energy Trip Ticket Game"



uses



concept: Every decision made involving energy affects standards of living.

objective: Given the opportunity, the student will be able to recognize that energy conservation affects our standard of living.

time: 3 - 30 minute sessions

subject matter area: Science, Art, Language Arts

grade: 2-3

implementation:

- Activity:
1. Using magazine pictures, have students make collages depicting the use of energy in the following areas.
 - a. Things we use at home.
 - b. Things we use and do for fun.
 - c. Things we use for transportation.
 - d. Things we do for work (jobs).

You may want to put students in small groups to work on the collages, that are then shared with the class.
 2. Class discussion: Compare the use of energy depicted by each collage. How are they alike? How are they different?
 - a. Which items on our collages make our lives easier and more comfortable? How?
 - b. Discuss the idea that it takes a lot of energy to have and do the things depicted on the collages.
 3. To get the student to really understand that it takes a lot of energy for people to have and do things, play the following game:

materials:

Magazines
Glue
Butcher paper



implementation:

Activities:
(cont.)

ENERGY TRIP TICKET GAME

List several places the students go in school and charge one energy ticket for the cost of each. Example:

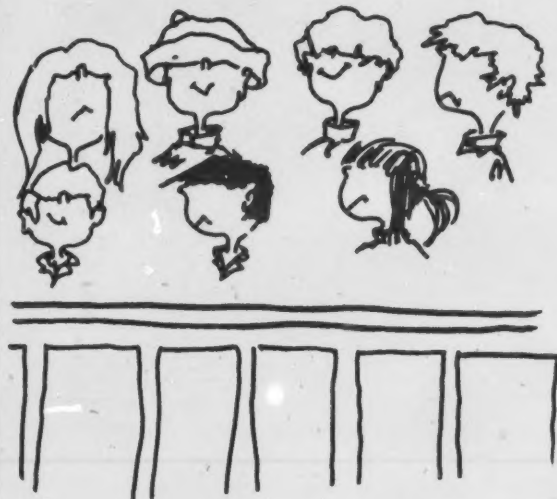
- | | |
|----------------------|---------------|
| a. Pencil sharpener | e. Recess |
| b. Drinking fountain | f. Music/P.E. |
| c. Rest room | g. Library |
| d. Lunch | h. Other |

Make a standardized energy ticket on ditto master, run off, cut and give each student 50 tickets. The student's name should be on each of the tickets or else the student should have a deposit place marked with his/her name. Each time the student takes a trip it costs one energy ticket. Place a folder or box on or near the door and have students put tickets there for collection.

Keep a record of how many tickets the students have left each day. Which students are wasting energy? Which students are conserving energy? How are they doing it? Also discuss energy saving ideas for trips in the classroom (e.g. at recess I can get a drink, sharpen my pencil and go to the rest room for 1 ticket. Otherwise it would cost me four tickets if I did them one at a time).

This stresses the idea that in one trip we can accomplish several things.

On the third day, discuss the idea of running out of energy tickets. There are no energy tickets left for the rest of the week. What can we do to save? What will it cost?

materials:

implementation:



Activity: (cont.)

As the students begin to feel the pressure of the energy shortage, relate to the actual use of energy depicted by the collages the students made. Consider the following:

- It takes energy to supply the things people use to make their life easier and more comfortable.
- We have to conserve that energy rather than waste it.

Have the students write a story about: **THE DAY THE ENERGY RAN OUT.**

SUGGESTED CAREER AWARENESS ACTIVITY:

Self-Awareness - Have students draw a picture of themselves doing a favorite activity which requires the use of energy other than physical energy.



materials:



SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the students will be able to describe verbally how conservation affects how we live.



Developed by: Dan Grimes
EME

title: "Electric Appliances Save Time, But How About Energy?"



uses



concept: Every decision made involving energy affects standards of living.

objective: Given the opportunity, the students will be able to recognize how people use energy in the home to do work that once was done by hand.

time: 4 - 30 minute sessions

subject matter area: Science, Art

grade: 2-3

implementation:

- Activity:
1. To get the students thinking about the amount of human energy spent and the amount of time it takes to do things, ask them if they would rather walk, ride a bike or ride in a car 5 miles to a friend's birthday party.
 - a. Ask them why they chose what they did.
 - b. How many chose a bike or car? Why? (To save time and energy?
 - c. Which would take the longest amount of time? The least?
 - d. Which would take the most effort? The least?
 - e. Which would be the best exercise? Why?
 2. After the above discussion, the teacher demonstrates an electric knife, electric can opener, electric mixer, and electric drill to illustrate how people use energy to save time and effort. Students should keep track of time as the teacher:
 - a. cuts a bar of soap with each knife.
 - b. drills a hole in a block of wood with each drill.
 - c. Mixes flour and water with each mixer.
 - d. Opens the bottom of empty cans with each can opener.Students should compare to see which tool in each pair takes more time and effort to work.

materials:



Electric drill, hand drill.
Electric mixer, egg beater, bowls, flour, water.
Electric can opener, hand can opener.
Electric knife, hand knife.
Collage material (magazines, scissors, glue).

Film:
"Spin! Toot! Scoot!" Forms of energy used in toys: MM 1970



Implementation:

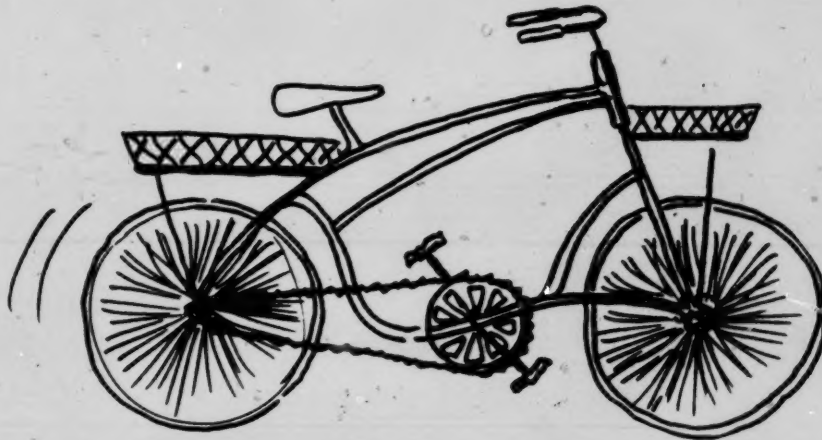


Activities: (cont.)

3. Discuss the advantages and disadvantages of using so many convenient devices.
4. Make a collage depicting the home devices people use to reduce their work. (Convenient appliances and tools.)
5. Show film: "Spin! Toot! Scoot!" Relate to ways we use energy.

SUGGESTED CAREER AWARENESS ACTIVITIES:

Invite a homemaker (mother or father) to talk to the students about his/her job and how the use of convenient home devices affects the job.



Materials:



SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will list or tell home devices that are used to make work easier.



Developed by: Dan Grimes
EME

title: "Subject and Predicate Cards 'Mix and Match'"



uses



concept: Each form of energy is used in many ways.

objective: Given the opportunity, the student will be able to gain information about energy use by matching subject phrases with predicate phrases.

time: 1 - 30 minute session

subject matter area: Language Arts

grade: 1-2

implementation:

1. Prepare 2 sets of cards. One set should be a different color than the other. On one set of cards place the subject phrase of a complete sentence on each card. Place the predicate phrases on the cards of the other color. Complete all the cards using about 15 sentences. Sentences can be about energy sources, uses, occupations, etc.
2. Pass all cards out to the students.
3. Have the students move around to each other, comparing cards, until all cards are matched. Students will then read their matches.

Any kind of information can be placed on these two sets of cards: questions and answers about any subject, math problems, syllables of words, etc.

Besides giving children knowledge about whatever is on the cards, this activity provides practice in inquiry, reading, sentence structure, and oral communication.



materials:



Approximately 30 3" x 5" cards



implementation:



(cont.)

SAMPLE CARDS

Card 1

1. A plant
2. Solar Energy
3. A Farmer
4. A scientist
5. A dam worker
6. The sun
7. A house
8. Nuclear power
9. A car
10. Geothermal energy
11. A river
12. A mine worker
13. The air
14. The land
15. Energy

Card 2

uses the sun's energy
is a future energy source
uses a lot of gasoline
discovers new energy sources
uses water to produce energy
is a source of energy
uses a furnace
is a source of energy
uses oil to help it run
is found under the ground
can be polluted
works underground
can be polluted
can be polluted
can be conserved

Note: Often correct matches can be made in more than one way.



materials:



SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student is able to match correctly subject and predicate phrases that make complete sentences.



Developed by: Dan Grimes
EME

title: "The Pencil Tree"



uses



concept: Each form of energy can be used in many ways.

objective: Given the opportunity, the student will draw an energy cycle depicting the making of a pencil.

time: 1 - 30 minute session

subject matter area: Science, Social Studies

grade: 2-3

implementation:

- Activity:
1. Present pencil tree to class as suggested under materials section. Begin discussion: "Where do pencils come from? How are they made? What materials are used? Where does the wood come from? How long does it take for a tree to grow big enough so that the wood can be used? (Pictures of trees of various sizes and ages will help illustrate this point.) Does it take energy to grow a tree? A tree is a plant and gets its power or energy to grow from the sun."
 2. Other points to be made: Once a pencil is used, is it gone? There is no recycling a pencil. Proper use of a pencil sharpener will prolong the life of a pencil. A pencil is a tool and should be used properly.
 3. Pass out drawing paper. Direct the students in drawing a large circle, and picture or list the steps necessary in making a pencil. Refer to the sample attached and share with the students.

materials:



A pencil tree made of a large branch "planted" in a container of plaster of paris with a pencil for each child hanging from it.

Pictures of trees of different ages.



Implementation:



SUGGESTED CAREER AWARENESS ACTIVITY:

- To illustrate how slowly a tree grows, invite a forester in to talk to the class. At the beginning of the school year, have him/her help each child plant a tree seed.
- A field trip to a local nursery. Have the nursery helper point out the ages of the various trees, how carefully trees must be handled, and the cost involved.
- The students may wish to plant a tree on the school grounds. Over several years time they could witness the growth for themselves.



materials:



SUGGESTED ASSESSMENT ACTIVITIES:

Given the opportunity, the students will be able to describe verbally or in writing, the pencil tree energy cycle.

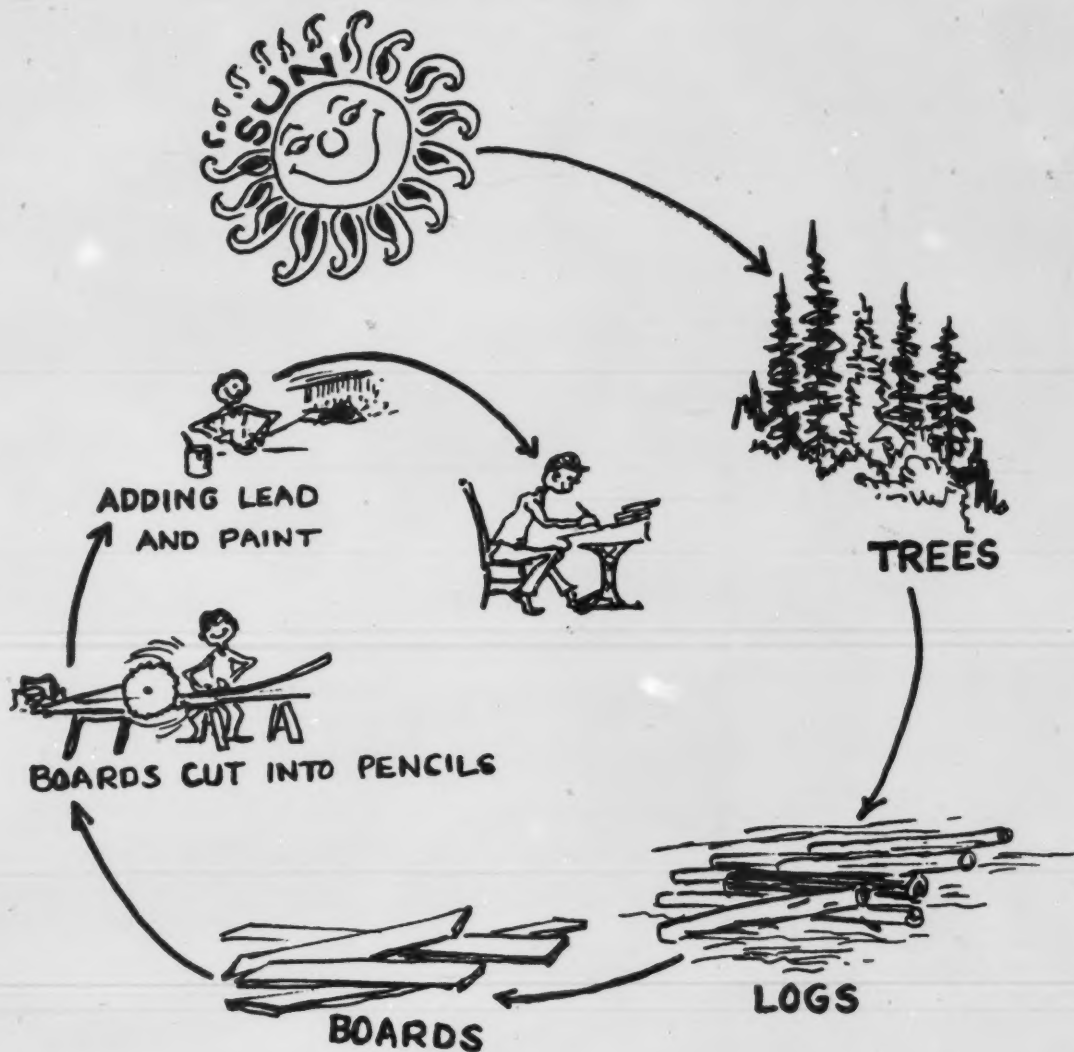


Developed by: Zelpa Boyd
Cheyenne, WY

Revised by: Dan Grimes
EME



activities

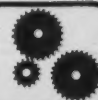


USES

title: "Energy - How Do We Use It?"



uses



concept: Each form of energy can be used in many ways.

objective: Given the opportunity, the student will be able to list ways we use energy in the home and community and then list conservation measures for those uses.

time: 4 - 30 minute sessions

subject matter area: Social Studies, Science

grade: 3

implementation:

Activity: 1. Have the students, in a class discussion, fill in a chart like the example below:

USES OF ENERGY IN:					
Home	School	Transportation	Industry	Services	Recreation
1. Heater 2. Stove 3. Lights 4. 5.	Lights Heat	Car Truck Bike Walking	Lights Machines		

2. Discussion questions:
- Ask the students which of the listed items they use. Why?
 - How often do you use them?
 - From the list, which items are used the most? The least? Why?
 - If you had to, could you cut down on the use of some of the items? Which ones? How would you do it?

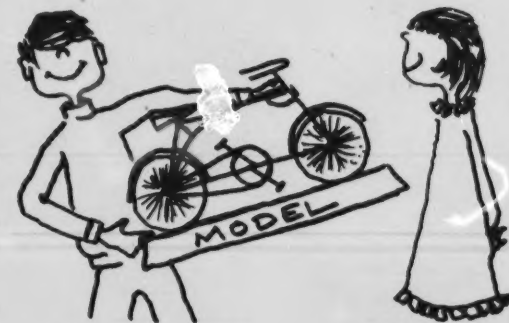
materials:

Chart made of butcher paper



Film:

"Transportation Revolution: Story of America's Growth", LCA, 1970.



implementation:**Activities:**
(cont.)

- e. What are some things people could do to cut down on using so much energy? Make a class list of solutions.
 - f. Why do you suppose people use so much energy?
 - g. What would happen, if we could not use various items anymore? What would people do?
3. Invite an older person to class to talk about the energy use and lifestyles in the 1920 and 1930's. Using the categories listed on the chart, have the students compare the past with the present. List advantages and disadvantages. Were people happy then? Did they have fun with what they had as compared to today? (Discuss the notion that possibly we shouldn't equate happiness with material conveniences.)
 4. Show film, "Transportation Revolution". Discuss and relate to present and past energy uses.

SUGGESTED CAREER AWARENESS ACTIVITY:

As an extension of Activity #3, direct students to ask questions of the older person about the use of leisure time when he/she was a child. Allow students to compare/contrast their use of leisure time.

**materials:****SUGGESTED ASSESSMENT PROCEDURE:**

Given an opportunity, the student will list uses of energy in the home and school. He/she will then list which uses could be conserved.

Suggested Multiple Choice Questions:

1. More energy is used in the:
 - a. Home
 - b. Community
2. To cut down on the use of energy people could:
 - a. Turn off lights when they are not being used.
 - b. Drive smaller cars that use less gas.
 - c. Both of these.
3. People today:
 - a. Use less energy than in the past.
 - b. Use more energy than the past.
 - c. Use the same amount as in the past.

Developed by: Dan Grimes
EME

title: "Fuelish, the Energy User"



uses



concept: All industrial processes make use of several forms of energy.

objective: Given the opportunity, the student will be able to recognize that we use many forms of energy daily in a great variety of ways.

time: "free-time"
activity, varies

subject matter area: Science, Reading

grade: 2-3

implementation:

Activity: Game of Fuelish, the Energy User.

1. Directions to teacher: Make a single copy of the Fuelish card and 4 copies of each of the other energy user cards. These could be run on heavy tagboard or run on paper and mounted on cardboard or railroad board.
2. Game directions: To be played by 2-4 players in the same manner as Old Maid.
 - a. Deal out all cards.
 - b. The player to the left of the dealer draws one card from the player on his/her left. If the person playing can match a pair of cards, the pair is to be laid down.
 - c. Then the person to his/her left draws in the same manner and play goes on until someone is out of cards.
 - d. Scoring is as follows:
 - + 1 point for each card down when someone goes out.
 - 1 point for each card still held.
 - + 3 points for going out first.
 - 5 points if you hold Fuelish.

materials:

Fuelish and Energy User cards.
(See attached sheets.)



implementation:



SUGGESTED CAREER AWARENESS ACTIVITY:

Additional cards depicting people who use the objects in their jobs could be made. The object and the person who uses it could be a match.



materials:



SUGGESTED ASSESSMENT PROCEDURE:

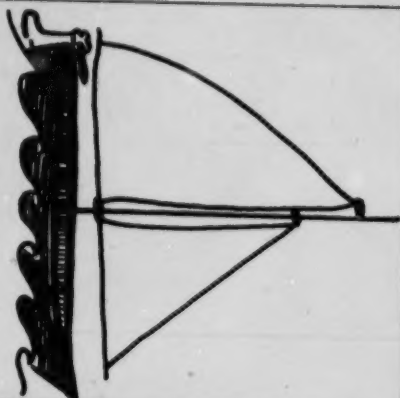
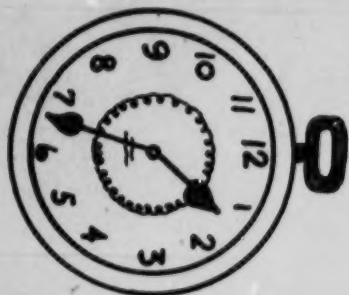
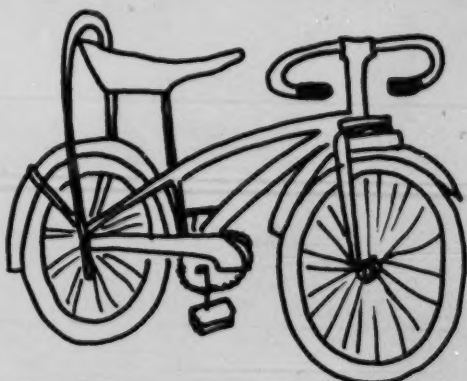
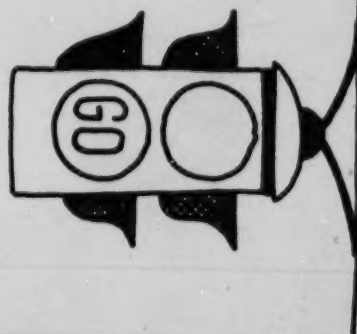
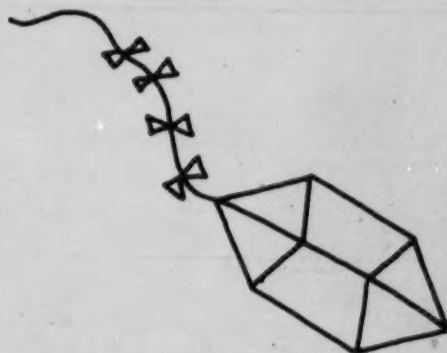
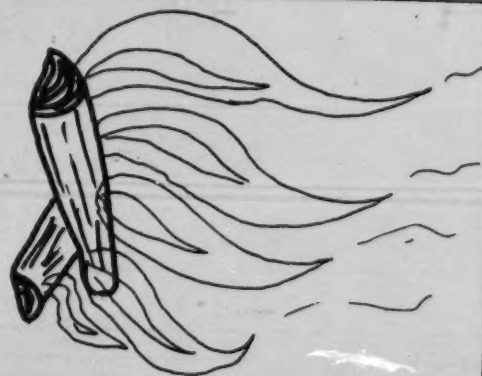
Given the opportunity, the student will be able to list at least 5 forms of energy that are used by people daily.



Developed by: LaVon Bucher
Kirkland, WA

Revised by: Dan Grimes
EME

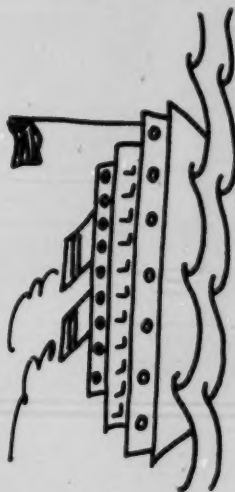
Energy User Cards



Energy User Cards



leaf



gas stove



diesel bus



by Peter Jones

title: "Electrical Energy Pig? —Not Me!"



uses



concept: Some human technologies and activities use more energy than others.

objective: Given the opportunity, the student will be able to better understand responsibilities in conserving electricity after identifying and discussing proper usage of electrical appliances.

time: 8 - 30 minute sessions

subject matter area: Science, Art, Language Arts

grade: 2-3

implementation:

- Activity:
1. (First day 20-25 minutes.) Distribute appliance coloring books to the students. Discuss pictures and have students color or mark every appliance that they or their families use in one day.
 2. (Second day 20-25 minutes.) Pass out mimeographed sheets of dot to dot pictures. Have students discuss the picture. Example: What do people say about pigs? "He eats like a pig." "He's a road hog." Do you ever act like a pig? How?
 3. Pass back sheets marked by students. Are you an electrical energy pig? How? What appliances were necessary to use? Which were not?
 4. (Third day 40 minutes.) Show pictures drawn by students of electrical energy pig. Pass out paper for students to draw posters to be displayed in school hall or homes, which show ways to conserve energy.

materials:



Mimeographed sheets
Construction paper
Books, pamphlets or brochures from
local power companies relating to
energy conservation.



Implementation:**Activities:**
(cont.)

5. Pass out and discuss home activity sheet. Have children complete at home with parents' help. Teacher could pass out booklet available from local utilities discussing electrical requirements of home appliances or those on how to save energy.
6. Have students discuss and compare home activity sheets. Perhaps teacher and students could graph use of appliances. If booklet was sent home, discuss the things families found they could improve (ways to conserve electrical energy).
7. Other possible activities:
 - a. Have some children write to large appliance manufacturing companies asking how they are improving electrical appliance usage of electricity.
 - b. If parents and students have tried to reduce unnecessary electrical usage, have them compare an earlier electric bill with a new one.
 - c. Have a group of students check the school building and see if they can think of ways to conserve electrical energy.
 - d. Write a story of what happened the day the electricity went off.

SUGGESTED CAREER AWARENESS ACTIVITY:

Interview parents or school personnel to find out ways in which they use electricity in order to do their jobs.

materials:**SUGGESTED ASSESSMENT ACTIVITIES:**

Given the opportunity to participate in discussions, home activities, and making posters, the student will understand his/her responsibilities in the conservation of electrical energy.



Developed by: Dian Murphy
Cheyenne, WY

Revised by: Dan Grimes
EME

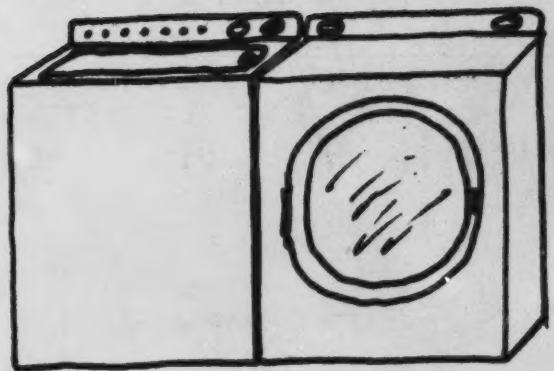
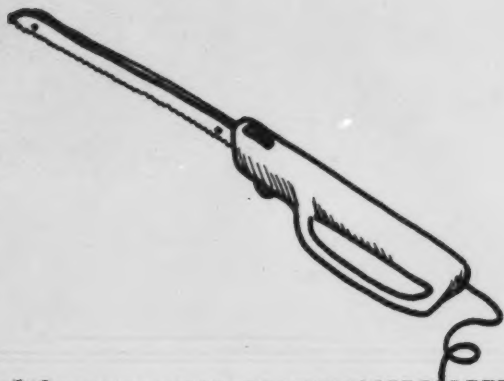
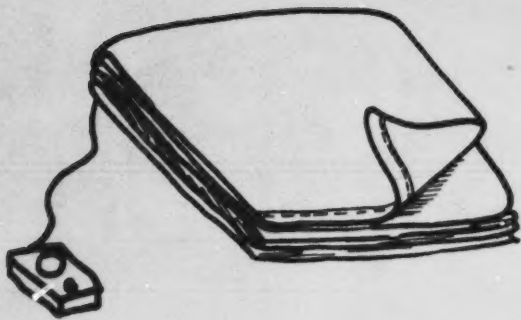
After you put your book together, color or mark all the electrical appliances you and your family would use today. On the empty pages can you draw other appliances you use?

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I am _____

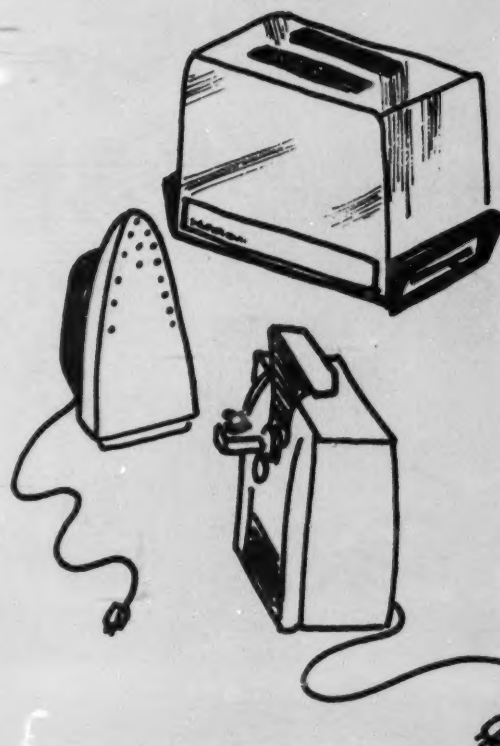
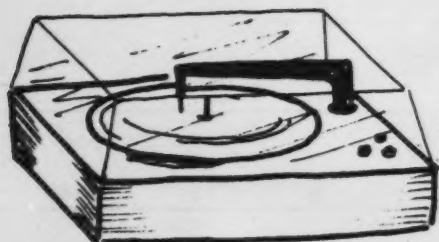
Make a list of other appliances your family uses.

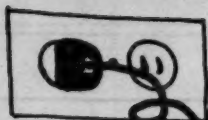


FOLD

CUT

CUT





24.



2.

3.

4.

5.

6.

①



7.

10.



13.

15. $\dot{w}$ 16. $\dot{w}$ 18. $\dot{w}$ 19.

8. $\dot{w}$ 9. $\dot{w}$ 12.



14.

17.

22.

21.

20.

23.

Home Activity

People in the United States use more energy than they ever have before. We have more people than in the past and we all have more machines and appliances.

Your child has been learning about the use of electrical energy in school. We would appreciate it if you would help your child complete the following check-list.

Please ✓ usage of all appliances used commonly in your home.

Record-tape player	_____	Electric razor	_____
Radio	_____	Electric can opener	_____
Toaster	_____	Electric stove	_____
Vacuum	_____	Electric knife	_____
T. V. set	_____	Washer	_____
Lights	_____	Refrigerator	_____
Mixer	_____	Dryer	_____
Heat	_____		
Electric toothbrush	_____	Add others:	
Fan	_____		_____
Electric blanket	_____		_____

title: "How Plants Grow"



uses



concept: All living things and natural processes require energy.

objective: Given the opportunity, the student will be able to observe the effect of sun on plants.

time: 3 - 30 minute sessions

subject matter area: Science, Art

grade: 1-2

implementation:

- Activity:
1. Present the class with two plants. What do we have here? Allow discussion as to what the children see; size, kind of plant, color, etc. These are geranium plants (or whatever). The green leaves make starch, fat, protein, vitamins, and other things and store these materials in the leaves. How does this work? Energy from the sun makes these small leaf factories work.
 2. What would happen to one of these plants if we put it in a dark closet? Discussion. Let's do it and find out. Plant pots of soil with zinnia seeds. (If practical allow each child to plant a small pot.) Place one grown plant and one newly planted pot in a dark closet. Place the others in a sunny window.
 3. One week later:
 - a. Take the plants out of the closet and examine. Allow plenty of discussion about the plants. Compare with the plants that were allowed to remain in the sunny window. Pass out paper. Direct the children to fold the paper in half. On one half have them write, "These plants were in the closet." On the other half write, "These plants were in the sunny window."

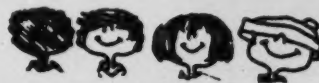
materials:



Two green plants of equal size, geraniums, marigolds, others.
Pots of soil and zinnia seeds. (Milk cartons may be used for potting plants.)



Implementation:



Activities:
(cont.)

Direct the children in making illustrations of the two plants.

4. One week later:
 - a. Bring out the plants again, noting the differences. How are these plants that were in the closet? Why? We watered them the same as those in the window. What has caused the differences? Allow time for discussion. Then have them draw illustrations of the plants, as before.

SUGGESTED CAREER AWARENESS ACTIVITY:

Visit a nursery to learn about the job of a nursery worker, or invite one to speak to the class.



materials:



SUGGESTED ASSESSMENT ACTIVITIES:

Given the opportunity, the students will be able to describe verbally why plants need sunlight.



Developed by: Zelpha Boyd
Cheyenne, WY

Revised by: Dan Grimes
EME

title: "The Apple Factory"



uses



concept: All living things and natural processes require energy.

objective: Given the opportunity, the student will draw a food chain beginning with the sun and ending with the child.

time: 2- 30 minute sessions

subject matter area: Science

grade: 1-2

Implementation:

Activity: 1. Pass out apples, one per child.

Class discussion:

2. What is a factory? Why are they necessary? What do we get from factories? Explain to students: How the apple is made. Actually, it is a little storage house. It grows on a tree. The leaves of the tree make the food. To make something, energy is needed. Where does this energy come from? The sun. It takes the heat and light from the sun to make plants grow. Let's eat our apples and when we're finished we can plant the seeds. Allow plenty of discussion during eating as to the properties in an apple. Sweet, must contain sugar. Tart, pectin, juicy, has water, etc.
3. As the students finish, they come to the planting table and plant their seeds. Label each pot with the student's name. Put in a sunny window. One or two extra pots may be planted and put in a dark closet.

materials:

One apple per child.
Pots and potting soil.



Film:

"Legend of Johnny Appleseed" WD
1958

equipment:

16mm projector

activity no. 10

Implementation:



- Activities: 4. Follow-up activity: See a film about Johnny Appleseed or read the story to the class.
(cont.)
5. Discussion relative to the merits of an apple. How do we know that there is food in the apple? How does it taste? How do we feel after eating the apple? Are you still hungry?
 6. Direct the students to draw a food cycle including the sun, the tree, the apple, the child, seeds and planting.

SUGGESTED CAREER AWARENESS ACTIVITY:

Invite an apple farmer (if available) to speak to the class about his/her job.

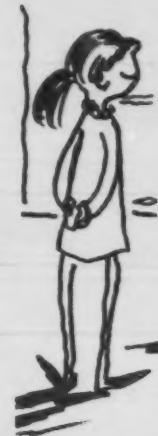


materials:



SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will be able to describe apple production by drawing a food cycle.



Developed by: Zelpha Boyd
Cheyenne, WY

Revised by: Dan Grimes
EME

title: "Six Life Roles and a Mini-Community"



uses



concept: Social, economic, and political pressures influence the efficient and economical use of energy.

objective: Given the opportunity, the student will realize that individuals may band together in citizen groups to affect political/social/economic choice.

time: several weeks
on-going

subject matter area: ATT

grade: 1-3

implementation:

- Procedures:**
1. Teacher provides display area (mural, large table or floor space) for construction of a mini-community.
 2. On the display area the teacher provides the physical features of the community. (Boundaries, forest, river, etc.)
 3. Teacher leads discussion of how a community develops and what goes into the making of one. List all student responses on the board. (The teacher might want the students to research the following areas of a community before listing items.)

Example:

Occupations	Goods	Services	Transportation	Recreation	Other
farmer	food	school	cars	hiking	
doctor	clothing	church	buses	boating	
teacher	cars	stores	train	movies	
_____	_____	_____	_____	_____	
_____	_____	_____	_____	_____	

materials:



Large table or mural on
floorspace - pine cones or ? for
trees.

Tempra paints- glue -paper-scissors

Film:

"A Field Becomes a Town" MGM 1965



Procedures Continued:

4. Share with the students the mini-community display area that has been prepared. Explain to the students that they are going to build a mini-community from scratch and role play 6 life roles. Producer-worker, family member, consumer/buying things, citizen/making decisions to help the community to be a good one, Individual/things you like to do, Learner/continue to learn, your way. Using the attached hand outs have the students make a community folder.
5. The following six steps in constructing the community are related to the life roles. Discuss with the students each step and how it relates the life role.

I. Citizen Life Role.

- A. As a citizen, have each student become a member of a land-use planning committee to decide where each of the following land zones and items will be in the mini-community. Class Discussion.
 1. Industrial area - factories
 2. Recreation - picnic, camping, swimming, etc.
 3. Farm land - crops/food
 4. Residential - homes
 5. Commercial - services
 6. Energy generating plant - (What source of energy will be used?)

As a producer,
build each area.
- B. As a citizens group, have the students decide upon a street system for the mini-community. Select a group of students/producers to make the streets. As a group, name the streets.
- C. As a citizen's group, elect a mayor, sheriff, and water, land and transportation commissioner.
- D. Have the students complete the Citizen Role hand-out.

II. Family Member Life Role.

- A. As a family member have the students select a parcel of land in the residential area and as a producer, build a house for the family.
- B. The student should decide what else they need and/or want for the family and either make it, bring it from home or pretend. (e.g. car, furniture, boat, playground, swimming pool. etc...) The student should be allowed to fix up his/her home area as they see fit as long as the planning committee agrees. Have the students submit a plan to the Land Commissioner if the need arises.
- C. Students fill out the Family Member Handout.

III. Producer Life Role

- A. Discuss the concept of Producer and how it relates to other life roles.
- B. List occupations a community might have.
- C. Have students select and role play a job.
- D. Have students build their place of work.

IV. Consumer Life Role

- A. Discuss the concept of Consumer and how it relates to other life roles.
- B. With the class responding, the teacher discusses and/or lists on the board the goods and services a community member buys and/or sells. (have each student fill out the consumer role handout.)

V. Individual Life Role

- A. Discuss the concept of the Individual Life Role. The teacher might want to relate it to self-awareness, interest and leisure time activities.
- B. Have each student observe the mini-community and then decide as an individual the activities they would like to pursue, (e.g. hobby at home, hiking, camping in the forest, swimming in the river, jogging, etc.) (See attached hand-out for Individual Life Role.)
- C. Discuss how this life role relates to the other life roles. Discuss concepts such as life styles depending on the Family and Producer roles. Discuss needs/wants as an individual and variables in real life that determine the outcomes. Do we always get what we want? Why?

VI. Learner Life Role

- A. Discuss with students the concept of life-long learning and the ways people continue to learn throughout their life.
- B. Ask the students to list the things they like to learn and the ways they like to learn best on the handout titled "Learner Life Role".
- C. Discuss with the students how the other life roles affect the learning role.

VII. Follow-Up Activities - Role-Playing Life Roles.

1. As citizens, the students can solve community problems that the teacher sets up, such as pollution of land, air, water, energy crisis, unemployment, etc. This sets the stage for group decision making.

e.g. Citizen Life Role

- The factory is polluting the air. The community needs the factory to produce goods and keep people working, but clean air is important too. What should be done?
- The factory is polluting the river. The community needs the factory but the river is important too. What should be done?
- The energy source supply used to generate electricity is extremely low. (e.g. River, coal supply, oil supply, etc.) People depend on this energy for use in the community. What can be done to assure a satisfactory supply of energy? (Develop and use a new source? Conservation? or both?)

Considerations to make as a class:

1. How does an energy problem affect the producer, consumer and citizen?
 2. What could each community member do to conserve energy?
- Factories, cars and local burning are polluting the air to the extent it is harmful. What should be done?
2. As a producer, each student could put their job into action by deciding what to charge for their goods and/or services, who needs it and/or what to do with the earnings.
 3. Make addresses for each dwelling - write letters to each other and use the post office.
 4. Make a telephone book with names, addresses and numbers.
 5. Keep a family budget - pay bills and buy goods and services on a weekly basis.

Discussion questions:

1. What would happen if no one worked in the community?
2. What would happen if citizens did not take an active part in voting, decision making and planning matters in the community?
3. Why do we need Laws and Rules in a community?
4. Why do we need recreation in a community?



activities



Page 5

Student Handout
Activity # 11

ME AS A LEARNER

Name _____

Things I Like To Learn

The Way I Learn Best Is



activities



Page 6

Student Handout
Activity # 11

ME AS AN INDIVIDUAL

Name

Things I Like To Do	Things I Don't Like To Do	Things I Am Really Good At Doing

Student Handout
Activity # 11

ME AS A CONSUMER

Name _____

[illegible]



Page 8

Student Handout
Activity #11

ME AS A CITIZEN

Name _____

Duties I have as a Citizen

- 1.
- 2.
- 3.
- 4.
- 5.



activities



Page 9
Student Handout
Activity # 11

ME AS A PRODUCER

Name _____

Occupation _____
(Job Title)

Duties _____

Name of the place I work _____



activities



Page 10

Student Handout
Activity # 11

ME AS A FAMILY MEMBER

Name _____

My Needs	What I Would Like To Have

implementation:



SUGGESTED CAREER AWARENESS ACTIVITY:

Invite guest speakers to class to discuss their role in the community (e.g.: Mayor, Commissioner, Factory owner, etc.)



materials:



SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will be able to describe verbally how citizens of a community work together to make decisions about economics, environment, and energy.

Developed by: Dan Grimes
EME

title: "Things I Like To Do"



uses



concept: Every decision made involving energy affects standards of living.

objective: Given the opportunity to make a list of things they like to do, the students will be able to examine the items and determine a value for each.

time: 1 - 30 minute
session-depending on grade
level

subject matter area: Social studies (values)

grade: 1-3

implementation: Ask the student to make the following chart on a sheet of paper:

Things I like to do	\$	E	e	F&/or M	"10"	Date
1.						
2.						
3.						
4.						
5.						

Ask the students to make a list of 5-10 things they like to do.

1. Place a \$ sign by any item which costs more than \$3.00 each time to do it.
2. Put an "E" in front of any item which uses a lot of mechanical energy to perform.
3. Put a small "e" next to the items that require a little mechanical energy to perform.
4. Using the code letters "F" and "M", record which of the items on your list you think your father or mother might have had on their lists if they had been asked to make one at YOUR age. (F= Father and M= Mother)

materials:

Paper
Pencil



implementation:

(continued)

5. Place a number "10" in front of any item which you think would not be on your list 10 years from now.
6. Finally, go down through your list and place near each item the date when you did it last.

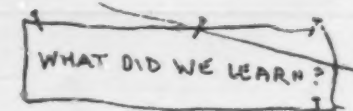
Discussion: Teacher should ask students for the responses they put down on each item. Ask why?

*Key questions-

1. What does your list tell you about the things you like to do?
2. List ways that you could conserve energy from the list of things you like to do.
3. Did your parents use less energy at your age than you? Why?

**materials:**SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will be able to make a value judgment by making a verbal or written statement about the things he/she likes to do.



Developed by: Dan Grimes
EME

CONVERSIONS OF ENERGY

GOAL:

IT IS ESSENTIAL THAT EACH
PERSON KNOW THAT ENERGY CAN
BE CONVERTED FROM ONE FORM
TO ANOTHER.



ACTIVITY
DESCRIPTION PAGE
CONVERSION (1-3)

GOAL: It is essential that each person know that energy can be converted from one form to another.

Concept: There are natural and artificial energy conversion systems subject to natural laws.

Activity #1 "Growing a Plant"
Grade level 1-3 Time: Several sessions
Science, Art
Given the opportunity, the student will observe a natural conversion system.

Activity #2 "Water to Steam"
Grade level 1-3 Time: 2 - 30 minute sessions
Science, Social Studies
Given the opportunity, the student will observe an artificial conversion system.

Activity #3 "A Bright Idea?"
Grade level 2-3 Time: 2 - 30 minute sessions
Science
Given the opportunity, the student will observe potential energy converted to energy in the forms of heat and light.

Activity #4 "Food - Energy and You"
Grade level 3 Time: 7 - 30 minute sessions
Science, Mathematics
Given the opportunity, the student will keep track of the number of calories consumed in his/her school lunches and become aware that food is converted to energy in the body.

Concept: Energy "costs" are partly related to the efficiency of energy conversions and transport.

Activity #5 "Walk or Ride?"
Grade level 3 Time: 2 - 30 minute sessions
Science, Mathematics
Given the opportunity, the student will consider factors that determine efficiency of converting one energy form to another by experimentation.

ACTIVITY
DESCRIPTION PAGE
CONVERSION (1-3) (continued)

Concept: All conversion processes use energy or lose heat energy.

Activity #6 "A Hot Idea!"
Grade level 2-3 Time: 2 - 30 minute sessions
Science

Given the opportunity, the student will observe and describe how conversions use energy or lose heat in the converting process.

Activity #7 "About Heat and Light"
Grade level 1-3 Time: 2 - 30 minute sessions
Science

Given the opportunity, the student will observe and then describe that energy conversions give off heat.



title: "Growing a Plant"



conversion



concept: There are natural and artificial energy conversion systems subject to natural laws.

objective: Given the opportunity, the student will observe a natural conversion system.

time: several sessions

subject matter area: Science, Art

grade: 1-3

Implementation:

- Activity:
1. Have your students obtain a small container in which to grow a plant.
 - a. Prepare a soil mixture.
 - b. Plant seed of choice.
 - c. Take care of and make daily observation of plant growth.
 2. Explain to students that plant growth is the result of conversion of the sun's energy. Plants will not grow or produce food (for the plant or for people or other animals) without the sun's energy. As the plants are growing, let's take for granted that the sun's energy is used by the plant to grow.
 3. After they have germinated, place a few plants in a dark place. Place the rest in the sunlight.
 - a. Observe the plants in both situations day by day and discuss the differences between the two.
 - b. Questions to discuss:
 - What do you observe about the plants in the dark?
 - What do you observe about the plants in the light?
 - Which plants look the healthiest (dark, light)? Why?
 - What does the sun's energy (or light) do for plants?
 - How did the plant use the sun's energy?
 - Will the plant bend toward the sunlight when turned in various positions?

materials:

Soil
Plant containers
Seeds
Collage material

Film:

"Food From the Sun,"
10 minutes, color
EBEC 1966, primary
level.



implementation:**Activities:**
(cont.)

- Does this show the plant is affected by the sun?

4. Make a "Sun-Energy Food Collage." Students in small groups cut and paste pictures on butcher paper using a sun symbol as a focal point. Use examples that include fruits, other food parts, and entire plants. Explain that plants use the sun's energy for growth and making food.

SUGGESTED CAREER AWARENESS ACTIVITY:

1. Invite a gardener to come to speak to the class about his/her job.
2. List names of jobs in which people work with plants. (e.g. farmer)

**materials:**SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, students will take proper care of the plant, discuss results of plant growth, and participate in the making of a collage.



Developed by: Dan Grimes
EME

title: "Water to Steam"



conversion



concept: There are natural and artificial energy conversion systems subject to natural laws.

objective: Given the opportunity, the student will observe an artificial conversion system.

time: 2 - 30 minute sessions

subject matter area: Science, Social Studies

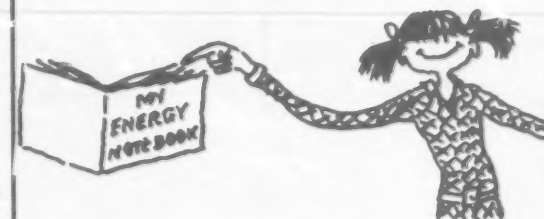
grade: 1-3

implementation:

- Activity:
1. Explain to students that one form of energy can be changed to another. Have the students discuss the meaning of "steam." Name various uses for steam such as steam heat for buildings, steam engines.
 2. Demonstration by teacher: Using a hot plate, boil water in a tea kettle. As the steam ascends, place a pinwheel in the path of the steam. Discuss that the heat energy was used to boil the water to create steam. The force of the steam moves the windmill or pinwheel.
 - a. Discussion and observations if applicable.
 - How long did it take the water to boil?
 - How long did it take the wheel to begin turning?
 - How long does it continue turning?
 - Is all the steam being used to turn the wheel?
 - b. Using a thermometer, measure the temperature of the steam. Could steam be used to heat homes?
 - c. At a safe distance you could also have the students feel, see, and smell the steam; discuss their reactions. Would the use of steam pollute air, land, or water? Why? Why not?

materials:

Tea kettle
Hot plate
Stick windmill or pinwheel
Thermometer



implementation:



Activities: 3. To emphasize the energy conversion aspect of heating water to make steam, draw pictures of the process.

Optional Activity: The students could keep an energy notebook to display the activities they carry out and the concepts they discuss.

SUGGESTED CAREER AWARENESS ACTIVITY:

Have students talk with parents about jobs they do in or out of the home which use steam. (e.g. steam iron for ironing.)



materials:



SUGGESTED ASSESSMENT PROCEDURE:

Given an opportunity, the student will discuss the results of the experiment, and do art work to express conversion of water into steam.

Developed by: Dan Grimes
EME

title: "A Bright Idea" 



conversion



concept: There are natural and artificial energy conversion systems subject to natural laws.

objective: Given the opportunity, the student will observe potential energy converted to energy in the forms of heat and light.

time: 2 - 30 minute sessions

subject matter area: Science

grade: 2-3

implementation:

- Activity:**
1. Demonstration and discussion by teacher: Show and explain to students how a battery, wire, light bulb and socket work to produce light and heat.
 2. Explain to students that the dry cell battery has energy in it that is "sleeping" or energy that has not yet been used. This is called potential energy. Show the students how to tap the energy from the battery by hooking up the wires to the battery and light bulb. (Discuss each step you perform, as the students will be asked to do the same in small groups.)
 - a. Next, explain to students that when the light is on, energy is being used to do work and make light. When the light bulb is on, discuss:
 - How do we know the energy from the battery is working?
 - What is the bulb giving off?
 - Hydroelectric dams and electricity.
 3. Ask the students to form groups of four or five. Give them the materials needed to perform the experiment, following the teacher's instructions.
 - a. While the students are observing their experiment, have them note the light energy and heat energy given off.

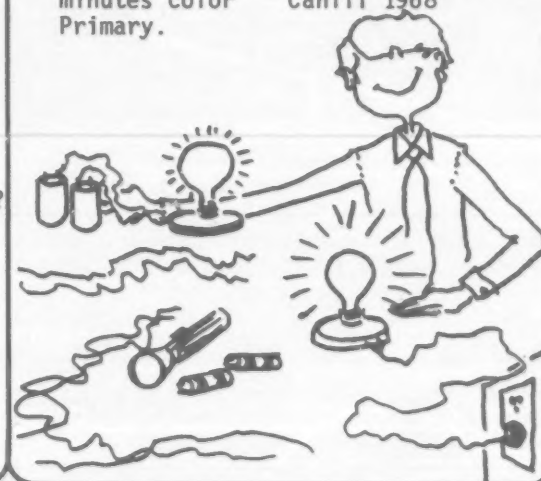
materials:

Several dry cell batteries and holders.
Wire, screw drivers, small light bulbs and sockets.



Film:

"Energy: Ability to do Work," 11 minutes color Cahill 1968 Primary.



implementation:



Activities: 4.
(cont.)

Next, have students list other types of potential and active energy that people use.

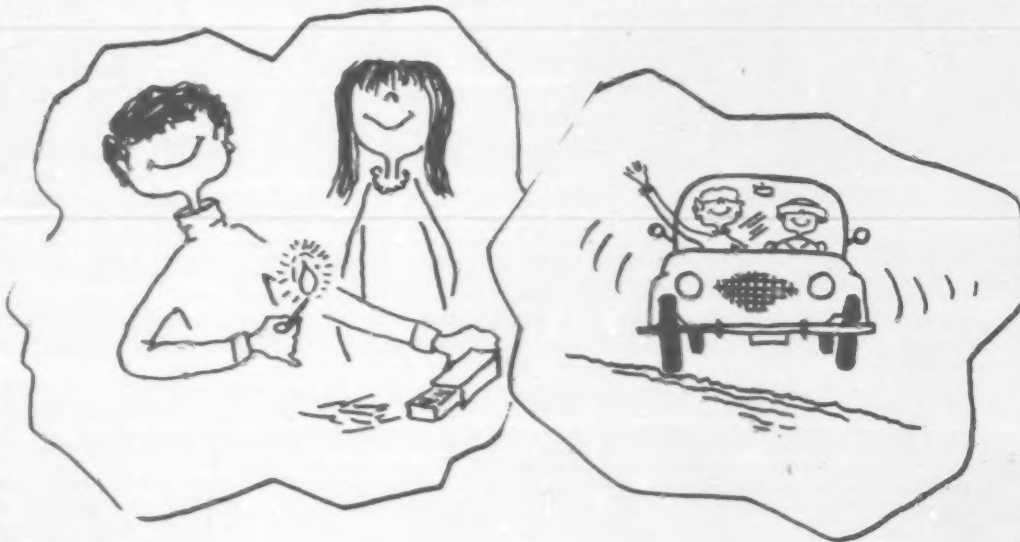
POTENTIAL ENERGY

Dams
Candle (unlit)
Match

ACTIVE ENERGY

Machines, when working
Cars in motion
Burning candle
Burning match

5. Show film: "Energy: Ability to do Work."
Optional Activity: Invite the custodian to speak to the class about tools that he/she uses in his/her job which require batteries.



materials:



SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will construct an electrical circuit and discuss potential and active energy as it relates to the battery and light bulb.



Developed by: Dan Grimes
EME

implementation:



- Activities: 3. Show film: "The Big Dinner Table".
(cont.)
4. Have students write a story about "Food - Energy and You."
- Optional Activity: You may want to keep a height and weight (growth) chart on each student. Relate to food energy converted by our bodies.

SUGGESTED CAREER AWARENESS ACTIVITY:

Have the students interview the school cook about his/her job in preparing food; specifically ask him/her about nutrition habits



materials:



SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will compute the number of calories in school lunch and keep a record each day.



Developed by: Dan Grimes
EME

title: "Walk or Ride?"



conversion



concept: Energy "costs" are partly related to the efficiency of energy conversions and transport.

objective: Given the opportunity, the student will consider factors that determine efficiency of converting one energy form to another by experimentation.

time: 2 - 30 minute sessions

subject matter area: Science, Mathematics

grade: 3

implementation:

- Activity:
1. Have the students count the number of steps it takes to walk a certain distance. (Walk a block or from one end of the playground to another.) Record the results.
 2. Next, have students use a tricycle, bicycle and/or wagon and count the number of steps or pushes it takes to go the same distances (coasting is allowed). Record the results.
 3. Which method is better for transportation?
 4. Bring out ideas like: Which is faster? Which took the least number of steps? Did you breathe at the same rate? Which method made the best use of your energy? What makes a method better? Energy use? Time use? Other?

materials:

Bicycle, tricycle and/or wagon.



activity no. 5

implementation:Activities:
(cont.)**TRANSPORTATION EFFICIENCY CHART**

Time	Number of Steps	*Breathing Rate
Walking		
Bicycle		
Tricycle		
Wagon		
Other		

*Breathing rate could be recorded as high, medium or low.

SUGGESTED CAREER AWARENESS ACTIVITY:

Give students a list of methods of transportation. Have them identify names of jobs which use each type of transportation.

materials:**SUGGESTED ASSESSMENT PROCEDURE:**

Given the opportunity, the students will be able to identify which methods of transportation were more efficient after experimenting.



Developed by: Dan Grimes
EME

title: "A Hot Idea!"



conversion



concept: All conversion processes use energy or lose heat energy.

objective: Given the opportunity, the student will observe and describe how conversions use energy or lose heat in the converting process.

time: 2 - 30 minute sessions

subject matter area: Science

grade: 2-3

implementation:

- Activity: 1. Heat a beaker or can of water starting at room temperature. Record the time you start heating the water. Write the temperature at the end of each minute until the thermometer shows 35° C. Is all the heat from the burner going into the water? How do you know? Remove the container of hot water, being sure to use protection to prevent burning. Record the time it takes for the water to cool to room temperature (as it was before heating). Which took longer, heating or cooling? What do you think is the reason?

HEATING AND COOLING WATER CHART

Minutes	Degrees° Heating The Water	Degrees° Cooling The Water
1 Minute		
2		
3		
4		
5		
Etc.		

materials:

Alcohol burner
Burner stand
Container for water
A large centigrade thermometer



implementation:



Activities: 2. After each minute record the temperature of the water (cont.) during both the heating and cooling processes.

Optional Activity: Have students predict the effect that a smaller or larger container would have on the amount of time it would take to heat or cool the water. Try the experiment.

SUGGESTED CAREER AWARENESS ACTIVITY: None

WARNING: THIS EXPERIMENT IS POTENTIALLY DANGEROUS FOR YOUNG STUDENTS. IT MIGHT BE BEST TO HAVE THE TEACHER DO ALL OF THE HEATING OF WATER, WITH STUDENTS DOING THE OBSERVATION AND RECORDING.

materials:



SUGGESTED ASSESSMENT PROCEDURE:

Given an opportunity to conduct and observe this experiment, the student will explain that heat is lost when a substance is heated.

Developed by: Dan Grimes
EME

title: "About Heat and Light"



conversion



concept: All conversion processes use energy or lose heat energy.

objective: Given the opportunity, the student will observe and then describe that energy conversions give off heat energy.

time: 2 - 30 minute sessions

subject matter area: Science

grade: 1-3

implementation:

- Activity:
1. Show the class a number of flammable materials, e.g. wood chips, match, twisted paper, oil in a lamp, candle, other.
 2. Next, make a "fireplace" of foil in a sand- or soil-filled box or in a small metal wastebasket...even an old pan. Arrange a support above it to hold a little foil pan with a cube of margarine.
 3. Ask students what matches, candles, lamps and wood are used for. How can these give off light? Does it just glow all by itself? What must we do to it to get light?
 - a. (Student responses.....)
 - b. Paraphrase responses: (To get light from these materials we must give them some energy - with a match or a lighter or another heat starter.)
 4. Ask students, as the fuel source is burning, what do we get from the candle or match or lamp? (Light and heat) Most things that give off light give off heat at the same time. Show that the fuel sources give off enough heat to melt the margarine.

materials:

Flammable materials:
Wood chips
Matches
Paper
Oil in a lamp
Candle
Tin foil pan
Cube of margarine
Pan or box for fireplace
Metal stand to hold tin foil pan.



activity no. 7

implementation:



Activities: 5.
(cont.)

Questions for discussion: What other light sources give off heat? (Electric lights, flashlight, car head lights, a camping lantern) Some might be checked in class. How about the sun?

SUGGESTED CAREER AWARENESS ACTIVITY:

Invite a fireman to speak to the class about firefighting.

WARNING: EXERCISE EXTREME CAUTION WHEN DEMONSTRATING
FLAMMABLE MATERIALS IN THE CLASSROOM.



materials:



SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will make a list of light sources which give off heat.

Developed by: Dan Grimes
EME

IMPACTS OF ENERGY

GOAL:

IT IS ESSENTIAL THAT EACH PERSON
KNOW HOW PEOPLE'S USE OF ENERGY
CREATES AN IMPACT ON ENVIRONMENTAL
AND ECONOMIC SYSTEMS.



ACTIVITY
DESCRIPTION PAGE
IMPACTS (1-3)

Goal: It is essential that each person know how people's use of energy creates an impact on the environmental and economic systems.

Concept: Various energy sources have differing impacts on the environment.

Activity #1 "Cleanbee"
Grade level 1-2 Time: Several sessions
Science, Social Science, Art
Given the opportunity, the student will recognize that various energy sources and uses have differing impacts on the environment.

Concept: Energy extraction and use alters original environmental conditions.

Activity #2 "What Is Energy?"
Grade level 1-3 Time: 10 - 30 minute
Science sessions
Given the opportunity, the student will be able to verbalize, list and illustrate the term "energy" and its impact on the environment.

Activity #3 "Water Pollution"
Grade level 1-2 Time: 2 - 30 minute
Science sessions
Given the opportunity to pollute water, the student will observe the outcome of fresh water vs. polluted water.

Activity #4 "Your Nose Knows!"
Grade level 1-3 Time: 3 - 30 minute
Science sessions
Given the opportunity, the student will identify examples of "Environmental Impact," whether it be a negative or positive one, by being a victim of impacts in the classroom.

Activity #5 "Every Litter Bit Helps"
Grade level 2-3 Time: 2 - 30 minute
Science sessions
Given the opportunity to participate in a litter activity, the student will demonstrate his/her awareness by caring for the environment.

ACTIVITY
DESCRIPTION PAGE
IMPACTS (1-3) (continued)

Activity #6 "Litter Bug"
Grade level 2-3 Time: Several sessions
Art, Language Arts, Social Studies
Given the opportunity, the student will list initial sources of, solutions to, and possible procedures for cleaning up litter in his community.

Activity #7 "You and Noise Pollution"
Grade level 3 Time: 8 - 30 minute
Science, Social Studies sessions
Given the opportunity, the student will know that all humans are polluters.

Concept: The use or non-use of any energy source requires environmental trade-offs.

Activity #8 "A Tour of The Neighborhood"
Grade level 1-3 Time: 3 - 30 minute
Social Studies sessions
Given the opportunity, the student will notice that people arrange their community structures for convenience and aesthetics.

Concept: Technologies and careers have resulted from environmental impact of energy.

Activity #9 "Physical Environment Collage"
Grade level 1-2 Time: 2 - 30 minute
Art sessions
Given the opportunity to participate in an Art activity, the student will create a collage of people responsible for keeping our physical environment clean.

Activity #10 "Physical Environment Occupations"
Grade level 2-3 Time: 2 - 30 minute
Language Arts sessions
Given the opportunity, the student will identify technologies and careers that have resulted from energy production and use.

Concept: Some human technologies and activities use more energy than others.

ACTIVITY
DESCRIPTION PAGE

IMPACTS (1-3)

(continued)

Activity #11 "Ways We Use and Save Energy"
Grade level 3 Time: Several sessions
Science

Given the opportunity, the student will understand that different amounts of energy are used in the production of everyday items in the environment.

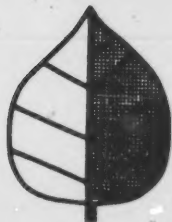
Concept: Conflicts over ecologically sound practices and aesthetic judgments will involve trade-offs if they are to be resolved.

Activity #12 "The Kool-Aid Stand"
Grade level 3 Time: 4 - 30 minute
Social Studies, Science sessions

Given the opportunity, the student will prepare an Environmental Impact Statement for the purpose of starting a hypothetical business (Kool-Aid stand business).

Activity #13 "Recycling, Stories and Activities"
-25 Grade level 1-2 Time: Several sessions
All Subject Matter Areas

The student will be able to describe conflicts that can be resolved by technological recycling and/or reusing processes.



title: "Cleanbee!"



impacts



concept: Various energy sources have differing impacts on the environment.

objective: Given the opportunity, the student will recognize that various energy sources and uses have differing impacts on the environment.

time: several sessions

subject matter area: Science, Social Studies, Art

grade: 1-2

implementation:

- Activity:
1. To introduce the unit, show film, "Our Round Earth - What's It Like?". This is to help children identify how much of the earth is water. After film discuss how much of earth is water compared to land. (A globe will do.)
 2. Show film, "Water: A First Film." Then introduce the booklet on Cleanbee. Do first page in Cleanbee booklet.
 3. Introduce term "pollution," and have children define it. See filmstrip, "Pollution."
 4. Using simple map skills, do the page in booklet on map of Oregon (or of your own state) and identify major water sources in and around the state. Each child will be able to identify the consequences to his state if this water becomes polluted.
 5. Show the film, "How Water Helps Us." Introduce a rain gauge to the children. Each child will be able to identify its purpose and be able to read its measurement to the nearest cm. Each child will do next page in Cleanbee booklet.

materials:

Cleanbee booklet
Microscope
Rain gauge
Water colors
Hot plate
Map of state
Films:

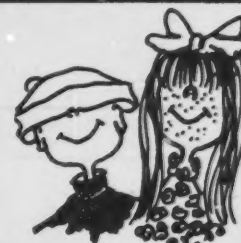
"Our Round Earth - What's It Like?"
11 minutes, COR, 1971
"Water: A First Film"
11 minutes, color BFA, 1968
"How Water Helps Us"
11 minutes, COR, 1957
"I Like Water"
8 minutes, AIMS, 1970
"Swimming Hole"
11 minutes, BFA, 1971

Filmstrips:

"Pollution" - Troll Associates
"Living Things Need Each Other"-EBF
"Water Cycle Circus" (See - Kits)

Film loop:

"Water in the City" - Holt-Ealing



implementation:

- Activities: 6. (cont.) The next page in Cleanbee booklet is an on-going activity for a two-week period. Each child will be able to read and record daily the amount of rainfall in the gauge.
7. Each child is to bring a tablespoon of detergent from home with the name of the detergent on a slip of paper. Each tablespoon is to be put in a baby food jar and filled with water. Shake the jars daily and have children observe what occurs in next four days.
8. Bring in a large sample of pond water. Drops of this pond water are to be examined under a microscope. Using water paints, each child will paint a picture of their microscopic view of water.
9. View filmstrip, "Living Things Need Each Other." Each child will be able to identify five things that depend on water and be able to identify why the water must be clean.
10. Each child will be able to define "biodegradable." Each child will complete a page in Cleanbee booklet about detergents. (Complete 1 through 4.) Then pour jar of detergent sample into equal amount of pond water.
11. Each child will view filmstrip from "Water Cycle Circus." Observe their pond water (not contaminated by detergents and heat on a hot plate. Then view samples under microscope. Have a child determine how heating water will affect life in the water. To boiling? Hot? A little? Put individual "pond" in a larger bowl of hot water; then in sunlight.
12. Each child will view the kit, Man and the Cities: City Problems and Alternatives. Also 8mm film loop, "Water in the City." Special emphasis will be given to the sewage treatment plant.
13. Each child will be able to identify four different things that pollute water and ways they can help to prevent pollution (two pages in the Cleanbee booklet).

materials:

(continued)

Kits:

Man and the Cities: City Problems and Alternatives - BFA
Water Cycle Circus - Encore Visual Education, 1970

equipment:

16mm projector
 Record player
 Filmstrip projector



implementation:**Activities:**
(cont.)

14. Take a field trip to a local sewage treatment plant. Each child will be able to identify the task of sewage treatment plants and how they help us to reduce pollution. One of the activities during this field trip is to interview an employee at the sewage treatment plant and find out his/her responsibilities and the training he/she needed for the job.
15. An additional trip for a higher grade would be a trip to a water conditioning plant. Prerequisites to this would be the identification of hard and soft water; the characteristics and origin of each.
16. Each child will be able to complete field trip summary form in Cleanbee booklet. Then paint a picture of one thing that impressed him/her at the sewage treatment plant.
17. After seeing the film, "I Like Water," have a physician or person from a water district come to visit the class and speak on the importance of clean water.
18. The teacher will get a form from the State Board of Health to have a water sample tested. The students will complete the form, take a water sample from the room's drinking fountain and send it in to have it tested.
19. See the film, "A Swimming Hole." Each child will complete the next two pages in Cleanbee booklet on how dirty water makes you sick, and identify three different ways to have fun in clean water.
20. Complete last page of booklet. This is to be used as an evaluative tool by the teacher. The child is to write what he/she can do to help have clean water and avoid polluting water.

materials:SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity to complete the questions and activities in the Cleanbee booklet, the student will be able to identify ways he/she can help to protect the environment.



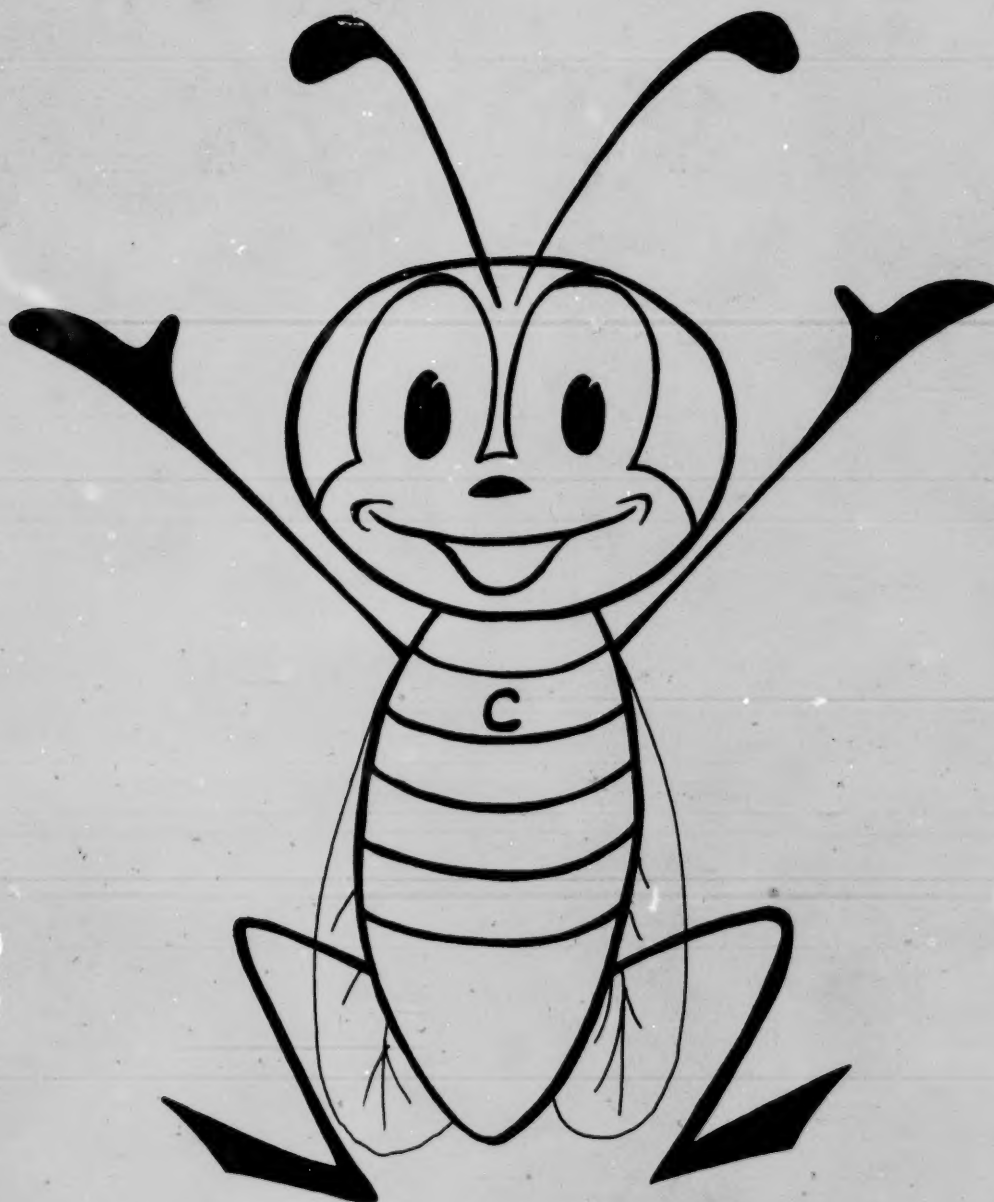
Developed by: Rowena Marks
Beaverton School District
Beaverton, OR

Revised by: Dan Grimes
EME



Cleanbee

*for
Clean Water*

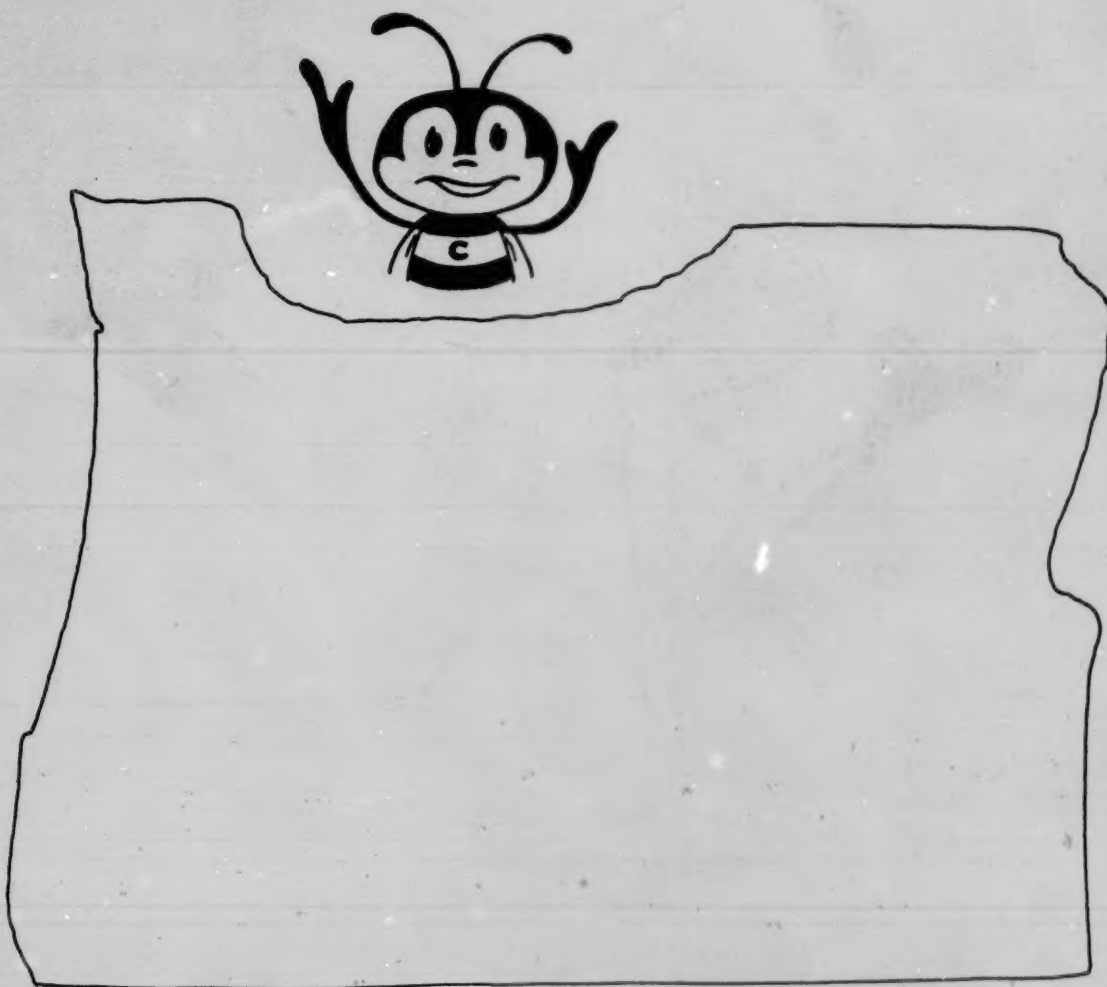


This is Cleanbee.

He likes clean water.

He wants to learn about clean water.

Color Cleanbee.



Here is a map of Oregon.

Find Beaverton.

Where could you find water in Oregon?

Color the water blue.

Is your home close to water?



We have lots of rain in Oregon.
This is how we get most of our water.
A rain gauge tells how much it rains.
Make a picture of a rain gauge here.

How Much Did It Rain In Oregon?

First Week

Date	Amount of Rain

Second Week

Date	Amount of Rain

Name of detergent

What does biodegradable mean?

Is your detergent biodegradable?

How does it look after 4 days?

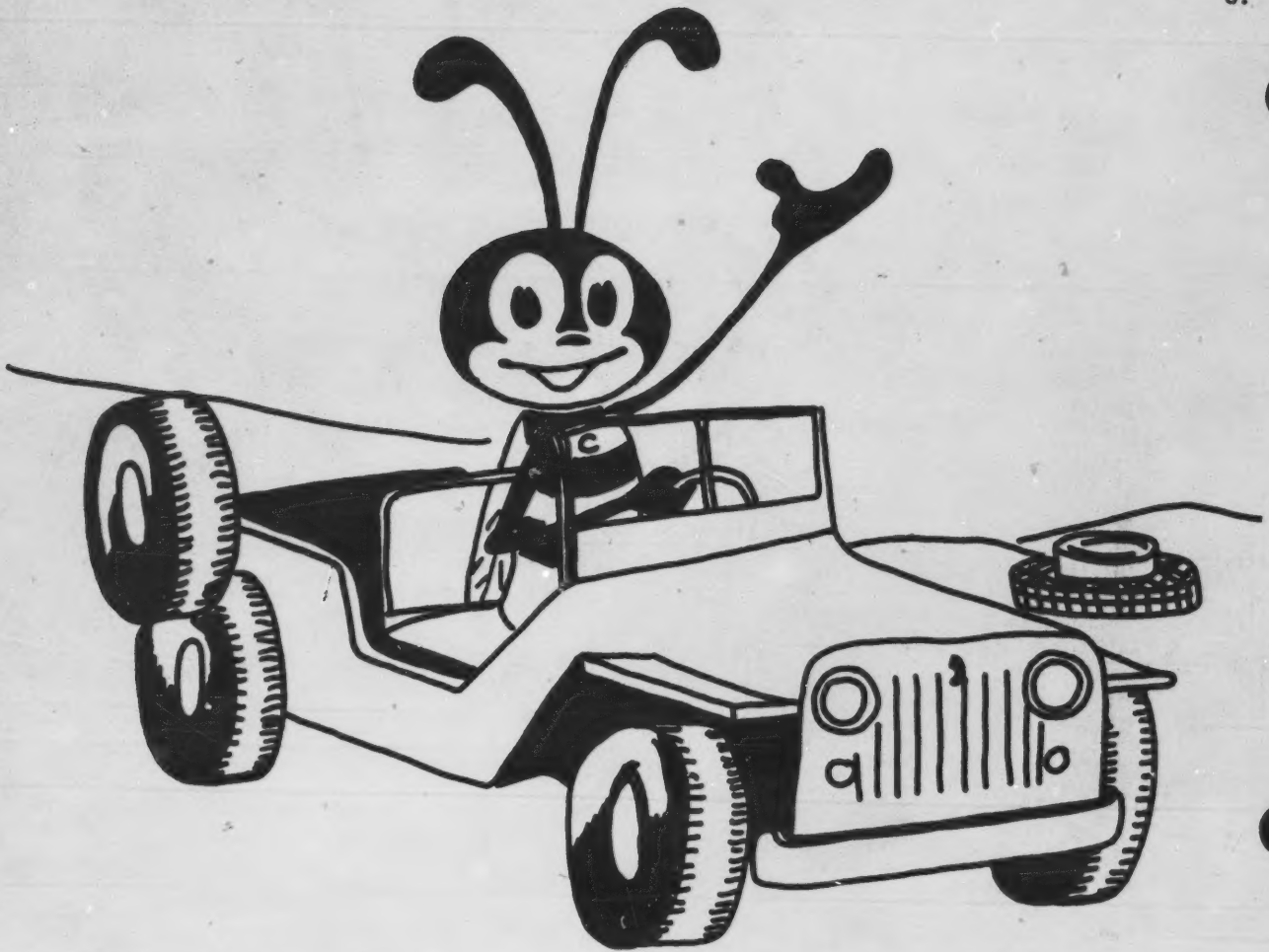
What happens when you put the detergent in the pond water?

MAKE 4 THINGS THAT POLLUTE WATER:

How can you help
Cleanbee stamp out
water pollution?



I could do this to help Cleanbee.



We went to visit a sewage treatment plant.

A sewage treatment plant

A sewage treatment plant helps us



Oh, oh!

Look at Cleanbee.

Dirty water can make you sick.

How can we help keep Cleanbee from getting sick?

Do we have clean water?

title: "What Is Energy?"



impacts



concept: Energy extraction and use alters original environmental conditions.

objective: Given the opportunity, the student will be able to verbalize, list and illustrate the term "energy" and its impact on the environment.

time: 10-30 minute sessions

subject matter area: Science

grade: 1-3

implementation:

- Activity:
1. Discuss the term "energy." Make a list of all kinds, sources and uses.
 2. Make an experience chart based on discussion. An experience chart is a large chart of experiences relating to a given topic, elicited from the members of the class and recorded by the teacher.
 3. Relate the use of energy by the human body: How we acquire, convert, and use food for energy and our dependence on it.
 4. Observe all the kinds of energy used at school. Take a walk through the school--possibly with a custodian-- to survey energy uses. Include the furnace room, a discussion of the heat source, how many months it is used, what kind of fuel, and energy used in gym, classrooms, kitchen, and office.
 - a. Include bus delivery of students to school and homes. Also consider the parking lot full of cars.
 - b. Make a list and follow up with illustrations.

materials:



Books:

The Last Free Bird - Stone

Farewell to Shady Glade - Bill Peet

National transportation week booklet
Worksheet on use of human energy
Old magazines and roll paper for mural
Tag for experience chart

Films:

"Garbage" - King SP, 1969

"Recycling" - Jour

"Junkyard" - FA, 1969

equipment:

16mm projector



implementation:



Activities: (cont.)

5. Class discussion on advantages and disadvantages of energy used in our building. The way we depend upon it.
6. Small groups illustrate large pictures of advantages and adverse effects (disadvantages).
7. Introduce the term "environment" and make labeled illustration.
8. Comparison of our environment opposed to a contrasting one (desert, lakeside, other). List student responses, then classify, compare and/or contrast them.
9. List ways the use of energy creates an impact on our environment.
10. Write creative stories about what could happen if one type of energy was suddenly cut off.
11. Have students poll parents about anti-pollution devices on personal cars.

SUGGESTED CAREER AWARENESS ACTIVITY:

Have students interview the custodian about his/her job after the tour of the building.

materials:



SUGGESTED ASSESSMENT ACTIVITY:

Given the opportunity to verbally discuss how energy is converted and utilized, students will be able to identify types of energy used in their community, school, and home and to make a comparison of their environment with a contrasting one, noting differences in lifestyles.



Developed by: Mary Holland
Beaverton School Dist.
Beaverton, OR

Revised by: Dan Grimes, EME

title: "Water Pollution"



impacts



concept: Energy extraction and use alters original environmental conditions.

objective: Given the opportunity to pollute water, the student will observe the outcome of fresh water vs. polluted water.

time: 2 - 30 minute sessions.

subject matter area: Science

grade: 1-2

implementation:

- Activity:
1. Fill two (2) clean jars with fresh tap water. Close with lids.
 2. Add contaminants to one of the jars.
 3. Let the jars stand for a period of time (2 days).
 4. After two (2) days, begin observations using body senses. (Smell, see, touch.) Note the differences between the two jars.
 5. Record observations for each jar.
 6. Discuss how this experience relates to our physical environment. (e.g. Pollution in the Earth's waterways.)

SUGGESTED CAREER AWARENESS ACTIVITY:

Identify occupations that have a major responsibility for pollution control.

materials:



Mayonnaise jar (2 per group)
Water
Water contaminants (e.g. detergents, gum wrapper, foods, glass, oil, gasoline, etc..)

SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will be able to list the observed differences between fresh water and polluted water using his/her body senses.

Developed by: Nancy Combs
Oregon City School Dist
Oregon City, OR
Louis Cava
Parkrose School Dist.

title: "Your Nose Knows!"



impacts



concept: Energy extraction and use alters original environmental conditions.

objective: Given the opportunity, the student will identify examples of "Environmental Impact," whether it be a negative or positive one, by being a victim of impacts in the classroom.

time: 3- 30 minute sessions

subject matter area: Science

grade: 1-3

implementation:

- Activity: 1. The teacher should place an open jar of ammonia, sulfur, sour milk or something that really produces a bad odor, someplace in the classroom. The teacher should not tell the students this is going to happen. Observe the students' reactions when they come into the room. When the students complain enough, remove the agent and discuss the students' reactions. Discuss the incident as an environmental impact (a negative one at that) in the form of air pollution in their classroom.
2. Teacher spreads litter and waste material all over the room. When the students come in and see this, record their reactions. Compare this incident to the negative environmental impact.
3. Place an air freshener capsule or something that has a really pleasant odor in the classroom. Discuss the reactions the students have. Compare this incident to a negative environmental impact.
4. Bring several small vases of flowers and place around the room. Ask the students what kind of impact is produced by the flowers.

materials:

Ammonia sample, sulfur, or sour milk



Implementation:



Activities: (cont.)

5. Have your class develop a reasonable definition of the phrase "environmental impact," keeping in mind that it can be negative or positive.
6. After winding up the activities, ask students to relate their environmental impact experiences to things that bring about change in nature. (Note: If students note only negative changes, remind them that many changes are positive.)

SUGGESTED CAREER AWARENESS ACTIVITY:

Have students identify those jobs which require the worker to work in an environment of good or bad smells.



materials:



SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will express his/her feelings about "environmental impact," positive or negative, by writing a story.

Developed by: Dan Grimes
EME

title: "Every Litter Bit Helps"



impacts



concept: Energy extraction and use alters original environmental conditions.

objective: Given the opportunity to participate in a litter activity, the student will demonstrate his/her awareness by caring for the environment.

time: 2 - 30 minute sessions.

subject matter area: Science

grade: 2-3

implementation:

- Activity: 1. Teacher leads discussion on the effects of litter (e.g. nuisance and danger) and that this is a problem to the environment.
2. Teacher and students record possible solutions to eliminate the problem.
3. Students and teacher will demonstrate their awareness by picking up the litter. P.S. Every litter bit helps!
4. Return to class and categorize litter in the two above mentioned areas--nuisance and danger.

Optional Activity: Invite the Department of Environmental Quality person for your area to present information about environmental quality. Focus on the emerging occupations in the environmental field. Become familiar with people who work to protect our environment. (e.g. police officers, scientists, garbage collectors, janitors, citizens (you and I) etc....)

materials:

Trash receptacle
Litter (all kinds)



SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will be able to categorize litter as either being a nuisance or being a danger to the environment.

Developed by: Louis Cava
Parkrose School Dist.
Portland, OR

Nancy Combs
Oregon City School
Oregon City, OR

title: "Litter Bug"



impacts



concept: Energy extraction and use alters original environmental conditions.

objective: Given the opportunity, the student will list initial sources of, solutions to, and possible procedures for cleaning up litter in the community.

time: Several sessions

subject matter area: Art, Language Arts, Social Studies

grade: 2-3

implementation:

- Activity:
1. Sprinkle garbage in hall of school. Teacher observes and lists who comments or picks up litter.
 2. Show film, "Garbage." List paper and metal wastes seen in film. Trace wastes back to energy consuming plants which produced them.
 3. Take litter walk inside and outside the school. Point out litter, take pictures, record responses. Start walk in cafeteria. Arrange to be spectators during several parts of lunch period (middle, last part).
 4. List some natural "litter."
 5. Map community "sore spots" on large map in class.
 6. List initial sources of, solutions to, and possible procedures for cleaning up litter in the community.
 7. Show film, "The Litter Monster." Make a litter monster for disposal of the litter which the class collects.
 8. The students are to make litter bags.

materials:



Books:

The Last Free Bird - Stone
Farwell to Shady Glade - Bill Peet

Films:

"Garbage" - King SP, 1969
"The Litter Monster"-Higgins, 1970

Tapes for one taping session

Polaroid camera

Large community map

Garbage can, papier-mache', chicken wire, (Litter monster)

Paper bags

Construction paper

Dittos

Trash articles for art projects

16mm projector

Tape recorder

Camera and film

implementation:



- Activities: (cont.)
9. The students are to make a litter badge with a motto. A contest to determine the best efforts should follow.
 10. The class should go out and collect litter as a class on playground or in a park. Use bags and badges they made. Put litter into litter monster. Discuss why there is such a quantity of paper and metal wastes today. Call local paper for publicity.
 11. The students should design posters to promote use of litterbags. Post in school and, if possible, in local stores.



materials:



SUGGESTED ASSESSMENT PROCEDURE:

Read stories, The Last Free Bird and Farwell to Shady Glade. Students will write stories about a particular animal in its native environment telling how litter pollution has affected his life.

Students will write, direct and act out short plays dealing with the effects of litter on their daily activities.

Students will construct an art project using trash articles such as: aluminum trays, styrofoam trays, magazines and cans.

Students should be able to plan and draw a mural tracing litter from its production in a factory to its disposal on a field.

Place litter in hall again. Teacher observes and lists again who notices or picks up litter.



Developed by: Barbara DeBernardis
Laura Dickinson
Beaverton School District
Beaverton, OR

title: "You and Noise Pollution"



impacts



concept: Energy extraction and use alters original environmental conditions.

objective: Given the opportunity, the student will know that all humans are polluters.

time: 8 - 30 minute sessions

subject matter area: Science, Social Studies

grade: 3

implementation:

- Activity:
1. The students list the sounds they hear in the bus while going on a field trip. (Teacher tape records the sounds.)
 2. Students refer to their list of noises recorded on the field trip. The teacher lists the noises on the board. Students write down the complete list from the board. Each individual student is to label his list of noises, either pleasant noises or unpleasant noises. Complete class labels and discuss the labeling of the list on the board.
 3. Students are assigned, as homework, to list noises they hear in their backyard or frontyard.
 4. Teacher lists the noises, backyard or frontyard, on the board. Again students copy complete list and each individual student labels the noises either as pleasant noises or unpleasant noises. Work as a complete class while labeling and discussing the list on the board. Compare the list of freeway or traffic noises with the list of frontyard or backyard noises. Which had the most pleasant noises and which had the most unpleasant noises?

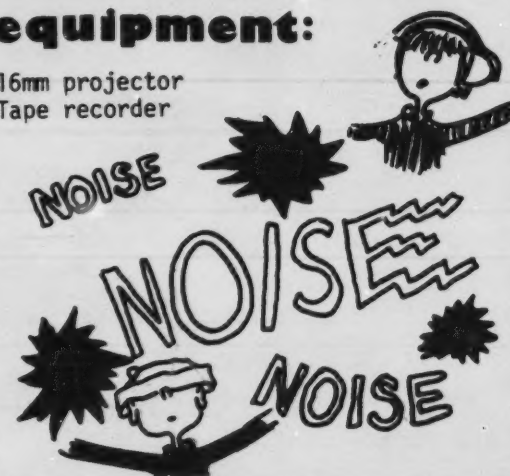
materials:

Tapes (enough for four separate tapings)
Poster paper (one per child)
Film - "Noise"- BFA, 1970
Two pieces of large chart paper



equipment:

16mm projector
Tape recorder



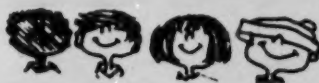
implementation:**Activities:**
(cont.)

5. The teacher tape records the noise of the students either as they come into the classroom or at some other time when the noise level is high. Teacher plays the tape to the students. Listen to student responses- "Is that you? Boy, you sure are loud!" Question: "Is that noise pollution?" Students are to answer question and write a paragraph defending their answers.
6. The teacher tape records the students during a quiet study time or a low noise level time. Teacher plays the tape for the students. (Listen to the comments.) Teacher then replays tape of classroom at high noise level. Question: "Which do you prefer?" Students write a paragraph explaining their choices.
7. The teacher plays all four noise tapes to the class. (Freeway or traffic, backyard or frontyard, high noise level and low noise level in classroom. Note: Teacher will have to tape backyard or frontyard noises.) Each student will write down:
 - a. How does noise change our environment?
 - b. What are some of the things we can do about noise pollution? (The student should list at least three ways he can help. Example: Not shout in the halls; turn down the radio.)
8. Show film, "Noise." Discuss.
9. Each student will design a poster for display in the home or school titled "Stop Noise Pollution."

Optional Activity: The teacher may choose to tape record the different noise levels instead of having students experience them directly. (Example: The teacher could record sounds during traffic jam rather than taking a field trip.)

materials:

implementation:



SUGGESTED CAREER AWARENESS ACTIVITY:

Students can compile a list of occupations that create noise pollution.

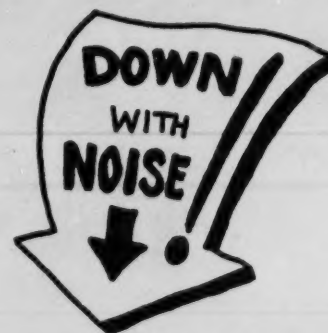
WAS THE EXPERIMENT WORTHWHILE?

materials:



SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will keep a list of three things he/she is doing to help noise pollution.



Developed by: Jacqueline Fitzgerald
Beaverton School Dist.
Beaverton, OR

Revised by: Dan Grimes
EME

title: "A Tour of The Neighborhood"



impacts



concept: The use or non-use of any energy source requires environmental trade-offs.

objective: Given the opportunity, the student will notice that people arrange their community structures for convenience and aesthetics.

time: 3 - 30 minute sessions

subject matter area: Social Studies

grade: 1-3

implementation:

- Activity:
1. Take the children on a walking tour of the school neighborhood. Ask them to see how many different kinds of structures (places - those with different uses) they see. They might include school, houses, apartments, stores, swimming pools, gas stations, playing fields, vacant lots, etc.
 2. Return to the classroom. List on a chalkboard all the kinds of land use (including vacant lots) the children noticed. Ask if they were all interspersed or if there was a pattern to the placement. Ask if they would like their community better the way it is or if it were changed. In most communities structural-business placement is determined by zoning. Ask why it is desirable to have the distribution they observed. How many want to live next to a hospital? A fire station? A gas station? A grocery store?

Optional Activity: Draw a picture of your neighborhood.

SUGGESTED CAREER AWARENESS ACTIVITY:

Have students list jobs that they saw being done while on the tour.

materials: None.



SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will identify the neighborhood-community structure through discussion.

Developed by: Lois Helton
Beaverton School District
Beaverton, OR

Revised by: Dan Grimes
EME

title: "Physical Environment Collage"



impacts



concept: Technologies and careers have resulted from environmental impact of energy.

objective: Given the opportunity to participate in an Art activity, the student will create a collage of people responsible for keeping our physical environment clean.

time: 2- 30 minute sessions

subject matter area: Art

grade: 1-2

implementation:

- Activity:
1. Teacher leads discussion on occupations and workers who keep our environment clean. (e.g. garbage collectors, custodians, etc.)
 2. Students look through magazines for pictures of these occupations.
 3. Cut out and paste for bulletin board collage.

SUGGESTED CAREER AWARENESS ACTIVITY:

An additional activity could be to interview the school custodian and follow up with an art activity illustrating his/her many useful jobs.



materials:



Old magazines
Scissors
Butcher paper
Paste

SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will be able to make a collage depicting people who help keep our environment clean.

Developed by: Nancy Combs
Oregon City School Dist
Oregon City, OR

Louis Cava
Parkrose School Dist.
Portland, OR

title: "Physical Environment Occupations"



impacts



concept: Technologies and careers have resulted from the environmental impact of energy.

objective: Given the opportunity, the student will identify technologies and careers that have resulted from energy production and use.

time: 2 - 30 minute periods

subject matter area: Language Arts

grade: 2-3

implementation:

1. Using the puzzle parts, the teacher holds up picture or visual aid indicating an occupation associated with Physical Environment. (e.g. garbage can = garbage collector.)
2. Students identify occupation and worker.
3. Proceed through list of occupations. (See attached sample.)
4. Do work sheet puzzle. (See attached sample.)
5. Discuss with the students the importance of these occupations.



materials:



Attached worksheet puzzle
Attached sample list of occupations and workers

SUGGESTED ASSESSMENT PROCEDURE:

The student will be able to identify occupations with workers when given a puzzle to put together.

Developed by: Nancy Combs
Oregon City School Dist.
Louis Cava
Parkrose School Dist.
Portland, OR



activities



PHYSICAL ENVIRONMENT OCCUPATIONS AND WORKERS

<u>Occupation</u>	<u>Worker</u>
Mechanics	Mechanic
Garbage collecting	Garbage collector
Sanitation	Street cleaner
Farming	Farmer
Forestry	Forest ranger
Custodial Work	Custodian
City maintenance	Care taker
Department of Environmental Quality	Pollution worker
Vector control	Crop duster
Meteorology	Weather forecaster (meterologist)

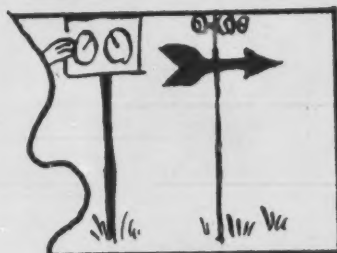
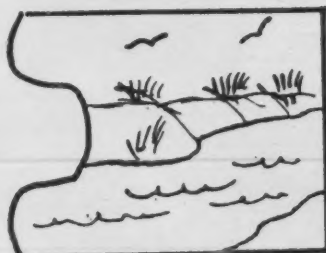


activities



WORKSHEET

Cut out the puzzle pieces and assemble the puzzle matching the worker with his work.



title: "Ways We Use and Save Energy"



impacts



concept: Some human technologies and activities use more energy than others.

objective: Given the opportunity, the student will understand that different amounts of energy are used in the production of everyday items in the environment.

time: Several sessions

subject matter area: Science

grade: 3

implementation:

- Activity:
1. Display on chalkboard or chart headlines from newspapers or magazines relating to energy problems. Use these clippings as motivation for a discussion, starting with questions such as: "What is energy? Why do we need energy? What makes energy? What makes the lights get bright? What made your new shoes? etc." Let the class discuss. Then give statement: "Energy is the capacity for doing work." (Teacher information: Energy is measured in calories, kilowatt hours and other units.)
 2. Refer to discussion of energy in activity 1. "Did any of you visit with your parents about energy problems." Write the following list of electric appliances on the chalkboard. Have students copy the words and write at least one advantage and one disadvantage for each:

toothbrush (electric)	air conditioning
toaster	radio
freezer	television
hot water heater	range
lights	dishwasher
heating system	

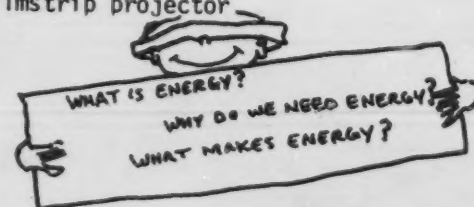
materials:



Newspaper and magazines for clipping.
Colored construction paper for collage
Film or filmstrip on production.
Pop bottle
Paper for making a diary.
Paper for creating and illustrating a story or book.
Film on industrial production of some common item, such as one from the NBC "Hot Dog" series.

equipment:

16mm projector
Filmstrip projector



implementation:

- Activities: 3. While the students are doing the preceding activity, copy the following list on another part of the board. Given in the table below are the relative amounts of energy used in operating various devices for one hour. The unit is the approximate amount of work a man could do in one hour (0.06 kilowatt hours). This list was taken from the Citizens' Workshops of the U.S. Atomic Energy Commission Handbook.

100 watt light bulb	2
Color TV	4
Manufacturing one pop bottle	10
Toaster	18
Air conditioner	50
Electric dryer	70
Oven - baking turkey	75
Small lawn mower	160
Gas log fireplace	300
Motor bike	500
Small car - 45 m.p.h.	1,000
Large car - 70 m.p.h.	4,500

4. Students share their list of advantages and disadvantages. Read together the list of energy used in operating devices. Listen for comments. With this additional knowledge have the students go back to their list of advantages and disadvantages. Some students may want to make some changes. The conclusion should result in such comments as: "Don't let hot water just run. Turn off lights and TV when not in use, etc."
5. As homework have the students write down each time they see a light on, a TV on, a radio on, etc. that no one is using. (This is best done over a weekend.)
6. Refer to homework assignment in activity 5. Have students share their homework.

materials:

implementation:Activities:
(cont.)

7. So far the class has just talked about how much energy something uses. At this point discuss how much energy it takes to make a radio, a TV, a light bulb, etc.? Show a filmstrip or film of some type of production.
8. Display a pop bottle. Have students create and illustrate a story about "Polly the Pop Bottle." This story should tell the experiences the pop bottle may have from the time it is melted down glass until it is empty. Let the children imagine! (Fact: It would take ten men one hour, in energy form, to make the pop bottle.)
9. Refer to pop bottle stories. Have some students share their stories with class. The class may want to make individual books of their stories for other to read.
10. Discuss: Now the pop bottle is empty. Where does the bottle go? To the garbage? If it goes to the garbage or is broken what will have to happen to replace the bottle? What can be done with the bottle? (Example: Return to the store for deposit.) What can we do with catsup bottles?
11. Plan a field trip to a recycling plant near your school. Students will observe glass being separated and broken to be melted and used again.
12. Students are to make a collage using magazines, newspapers and art paper. The theme of the collage: "Let's Save Energy!"
13. Have students make a small diary recording events for the following month. Students are to record how they saved energy each morning as class begins. (Example: "I turned off lights, used little hot water, and turned off the radio when I wasn't listening.") Comments from the teacher regarding students' behavior will increase their awareness and reinforce their changes in behavior.

materials:

I'M A POP BOTTLE

I'M FILLED WITH SOMETHING
GOOD TO DRINKWHEN I'M EMPTY-THERE ARE
TWO THINGS THAT MIGHT HAPPEN
TO ME!ONE IS TO BE DISCARDED-
AND THROWN AWAY WITH
OTHER GARBAGE.....BUT THE BEST
THING IS TO RE-CYCLE
ME FOR MORE
USE!

implementation:



Activities:
(cont.)

(Example: "Good! Sally turned off the lights!")

SUGGESTED CAREER AWARENESS ACTIVITY:

Have students ask their parents how they use and save energy in their jobs.



materials:



SUGGESTED ASSESSMENT PROCEDURE:

TRUE - FALSE

- _____ A car going 45 m.p.h. uses more gas than a car going 70 m.p.h.
- _____ Energy is the ability to do work.
- _____ A motor bike uses less energy than a color television set. (one hour)
- _____ People can save energy.
- _____ Shoes are made without using energy
- _____ People have energy.
- _____ One light bulb burns more energy than the kitchen oven. (one hour)
- _____ Changing cold water to hot water takes energy.

Developed by: Jacqueline Fitzgerald
Beaverton School District
Beaverton, OR

Revised by: Dan Grimes
EME

title: "The Kool-Aid Stand"



impacts



concept: Conflicts over ecologically sound practices and aesthetic judgments will involve trade-offs if they are to be resolved.

objective: Given the opportunity, the student will prepare an Environmental Impact Statement for the purpose of starting a hypothetical business (Kool-Aid stand business).

time: 4 - 30 minute sessions

subject matter area: Social Studies, Science

grade: 3

implementation:

- Activity:
1. This decision-making activity involves the students in planning a business venture in order to earn spending money. (e.g. Kool-Aid stand business, raising animals, kennel service when friends are out of town, etc.) This business should be one the students can relate to as well as one that has an effect on the neighborhood environment, such as noise pollution, water pollution, air pollution, land pollution, emotional stress of parents and neighbors, etc. We found the Kool-Aid stand business an exciting and controversial one to have in regards to environmental impact.
 2. The Environmental Impact Statement is a plan or statement the students will prepare in order to convince their parents and neighbors that their business will not have a negative impact on the neighborhood. The students will present ideas on how to solve the problems their business will bring about, such as noise, litter, traffic control, lawn and shrub damage, blocking sidewalks and many other problems parents and neighbors would be concerned about.

materials:



Film - "Treasure Hunt," 20 minutes, color, 1975 - Bread and Butterflies Film Series. Distributor (Milliken) Published by National Instructional TV



Implementation:

- Activities: 3. In selecting the Kool-Aid stand business, your students need to be concerned with the Environmental Impact of the following:
- Plant Site - Where on the neighborhood street should a Kool-Aid stand be placed; i.e., parent's yard, corner, etc.? (Think of the environmental damage.)
 - Construction - Of what material will the stand be made? (Consider visual pollution.)
 - Purchasing Supplies - What will you use in dispensing the Kool-Aid and what other things must you buy to make the Kool-Aid? Could the supplies be harmful to the environment? (litter, etc.)
 - Manufacturing - Will the waste be harmful? How will you solve the problem? Where and how will you obtain water?
 - Advertising - Litter? Visual pollution?
 - Traffic Control - Cars, bicycles, people, noise, fumes, etc.
 - Plant Clean-Up - What will you do with the daily waste? Recycling cups? Soap suds, etc?
 - Consumer Waste - Litter? Recycling? Cleaning up after them? Who is responsible - you or the customer?
4. Develop a method for the creation of an Environmental Impact Statement that will hopefully convince parents and neighbors that the Kool-Aid stand business will not harm the neighborhood. NOTE: Before doing this the teacher should send a note home to the parents explaining what the purpose of the lesson is and ask them to critique their child's proposal with concern. The actual Kool-Aid stand business does not have to be carried out.

materials:

implementation:

- Activities: 5. In the first two days of this project the class should (cont.) discuss the notion about hypothetically starting a Kool-Aid stand to make spending money. Inform the class that in starting a business like this they must first convince their parents and neighbors and get their approval for the project.
6. A list of the following should be made on butcher paper on the chalkboard:
- | | |
|-----------------|----------------------------------|
| Plant site | |
| Constructions | |
| Purchasing | Leave room between items for |
| Manufacturing | students' suggestions and ideas. |
| Advertising | |
| Traffic control | |
| Plant clean-up | For plant site, use a typical |
| Consumer waste | neighborhood street in Anytown, |
| | U.S.A. |
7. Ask the students to make decisions about each area above. Where will we build the Kool-Aid stand? Why? What harm will the location have on the environment, if any? What will we use to build the stand? Will it be visually polluting?
8. When the class completes the statements that they think will convince their parents concerning each area of business, the teacher should list these on a ditto so each student will get a copy to take home for parental approval.
9. In the final two days, have the students share the results with the class concerning whether their parents were convinced or not and why. During class discussion revise the Environmental Impact Statement, if needed, and resubmit it to the parents for approval again. Continue class discussion until approval is granted.

SUGGESTED CAREER AWARENESS ACTIVITY: As a class, have the students start a class business of their own and sell the produce to the student body.

materials:**SUGGESTED ASSESSMENT PROCEDURE:**

Given the opportunity, the student will list at least four (4) things to consider when preparing and Environmental Impact Statement.



Developed by: Dan Grimes
EME

title: "Recycling, Stories and Activities"



impacts



concept: Conflicts over ecologically sound practices and aesthetic judgments will involve trade-offs if they are to be resolved.

objective: The student will be able to describe conflicts that can be resolved by technological recycling and/or reusing processes.

time: Several sessions

subject matter area: All Subject Matter Areas

grade: 1-2

implementation:

This learning activity package contains the following:

1. Teacher's Guide
2. A set of 40 activity cards
3. Three (3) short story books on recycling/reusing.

*Note: Refer to the Teacher's Guide for instructions.

SUGGESTED CAREER AWARENESS ACTIVITY:

Several are included in the set of activity cards.

materials:

Indicated on each activity card.



SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will be able to describe three (3) recycling processes.

Developed by: Dan Grimes
EME

TEACHER'S GUIDE



A Recycling Learning Package
for Elementary Students
by Dan Grimes

illustrated by Chloe Poole

NOTES TO THE TEACHER

T6-1

This learning package was developed for primary students, that they might learn about the concepts of recycling, conservation and problems with litter.

The content of the learning package includes:

1. Teacher's Guide - Ideas for use of material
2. Masters for "Poppy Pop Bottle" Story Book
3. Masters for "Mrs. Newspaper" Story Book
4. Masters for "Jan the Can" Story Book
5. A set of Recycling Activity Cards

Goal: The student will recognize that environmental management has effects on individuals and social institutions.

Objective: The student will describe three different types of recycling which reduces litter. These might include:

- A. pop bottles
- B. newspapers
- C. cans

Activities: See activity cards to meet goal and objective:

- A. basic introductory activities
- B. extending the idea activities
- C. culminating activities

Introducing the concept of LITTER (consumer waste)

TG-3

How To Get Started

In introducing the concept of litter and to set the stage for learning about recycling refer to Activity Card #1, #1a, & #1b. Through these activities the students will become personally involved with the problem of litter (waste products), have a better understanding of litter and will recognize a need for the concept of recycling.

Introducing the concept of RECYCLING

How To Get Started

To introduce the concept you can use the stories of "Poppy Pop Bottle", "Mrs. Newspaper" and "Jan the Can". These are simple stories telling about recycling.

After you have completed the activities related to one of the stories the students should have a good idea about recycling products. Continue with the other stories related to recycling and then begin working with the set of Activity Cards. Remember: the story books and activity cards are only suggestions to help the teacher in presenting recycling concepts in an innovative and creative way. Use your judgment on how to best use these materials.

Teacher Notes on "Poppy Pop Bottle"

The story illustrates the concept of recycling for primary students. The author has tried to show how a pop bottle is recycled many times. When you introduce the story discuss the word "recycling" with your students. Ask them what they know about a pop bottle being returned and reused again.

Read the story with your class and discuss the process involved in recycling pop bottles.

When the book is assembled and you've finished the story, ask your students if they can tell the story of recycling pop bottles.

Next ... do Recycling Activity Cards #23 & 23a.

Teacher Notes on "Mrs. Newspaper" Story

The story illustrates the concept of recycling for primary students. The author has tried to show how a newspaper can be recycled, eventually to be used as newspaper again. Also the story illustrates that a newspaper can be reused in many other ways. If your community does not have a recycling center your students can learn about towns that do, as well as review recycling techniques they have available to them.

When you begin, discuss the word "recycling". Ask the students what they know about reusing newspapers. Read the story and discuss the processes involved. Then see if they can retell this recycling story.

Next... do Recycling Activity Cards #24 & 24a.

TG-7

Teacher Notes on "Jan the Can" Story

The story illustrates the concept of recycling for primary students. The author has tried to show how cans can be recycled.

When introducing the story ask your students how they might use a can. Ask them if they know what the word "recycling" means. Read the story and discuss the processes involved in recycling.

When finished with the story, ask your pupils if they can retell the story of "Jan the Can".

Next... refer to Recycling Activity Cards #25 & 25a.

Additional Resources for Further Study

Films: Garbage Dumps Ealing 1970 K-6
Urban Ecology Ealing 1970 K-6
Litter Monster Higgins 1970 K-6
Garbage King, S.P. 1969 K-6

Books: The Last Free Bird - Stone
Farewell to Shady Glade - Bill Peet

TG-9

About the Activity Cards

The recycling activity cards were made to help facilitate the Recycling Learning Package by getting students actively involved in an awareness of the effects of litter, waste, conservation and recycling reuseable products.

The activities were designed to be easily integrated into Reading, Language Experience, Art, Science, Mathematics and Social Studies.

The cards fall into three groups:

- A. basic introductory activity cards
- B. extending the idea activity cards
- C. culminating activity cards



The Story of

Mrs. Newspaper

story by Dan Grimes

pictures by Chloe Poole

①

Words to know:

newspaper

center

uses

factory

buy

mill

people

trash

recycled

reused

recycling



Hi!



I am Mrs. Newspaper.

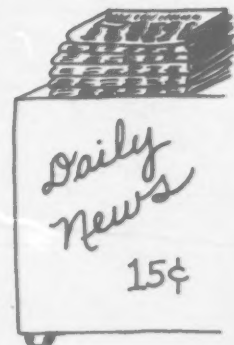
I have many uses.

I can be used over and over again.

Let me tell you about me.

People buy me
to read my news.

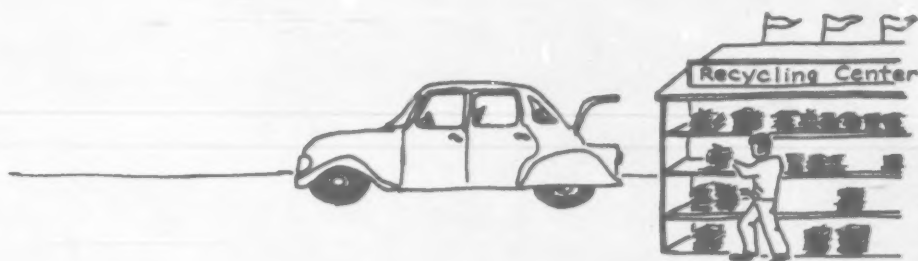
What will happen
to me when they
do not want me?





When people are done
with me they take me to
a recycling center.

Let me tell you about it.

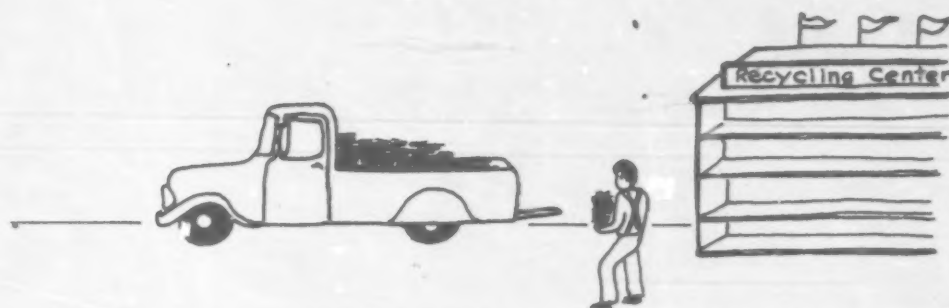


A recycling center
is a place to take old
newspapers.

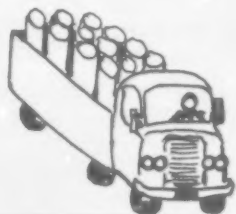
Many cities have them.

Does your town
have one?

There, they put me
on a truck. They
take me back to
the paper mill.



At the paper mill they wash me clean,
press me flat, dry me out and put
me on a big roll. Then I
am ready to be used again
to tell more news.



8

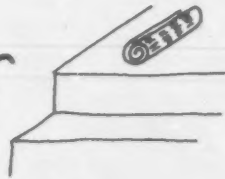
Wow!! I am ready to be sold again. People buy me again. They read my latest news.



or



or

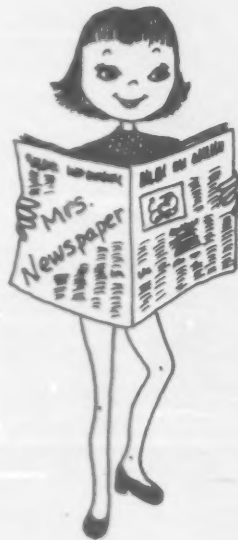


or

Newspaper Stand

9

I am happy.
I am used
over and
over again.



This is called
recycling.

Let me tell you more ways I
can be reused.

I can be used in trash cans.



I help keep
trash cans
clean.

Have you ever
used me
like this?

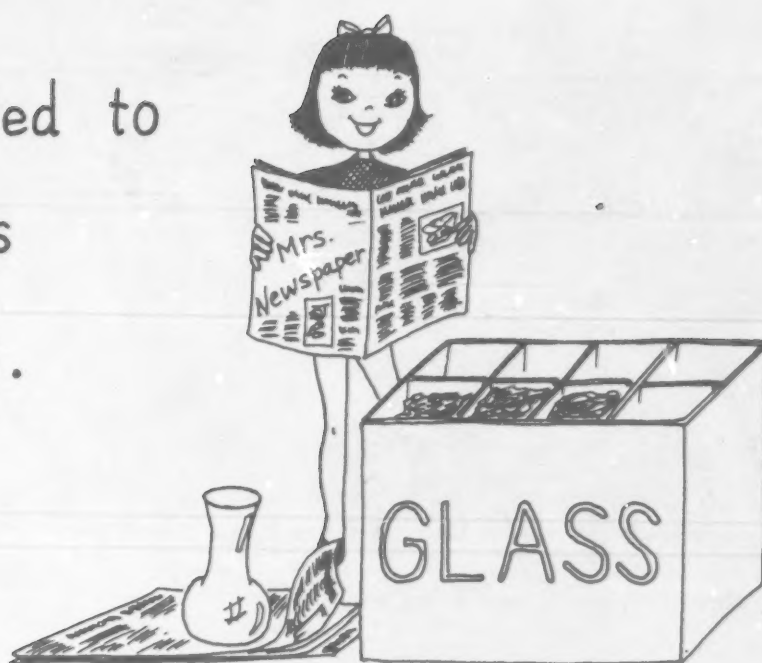
I can be used to
start a fire.



Do your mom
and dad use
me like this?



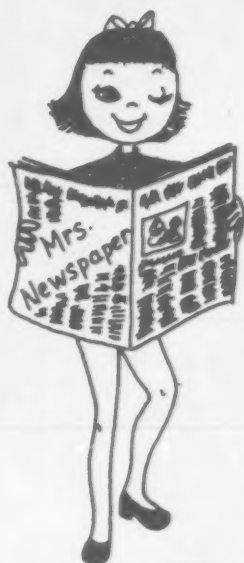
I can be used to
wrap things
that break.



I can be used to
wrap a gift.
Have you ever
used me
like this ?



I am happy.
I am used
over and
over again.



Can you think of more things
I can do ?



Can you tell the
story of recycling
newspapers now ?

Tell your teacher.



THE STORY OF POPPY POP BOTTLE

Story by Dan Grimes
Pictures by Chloe Poole

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2

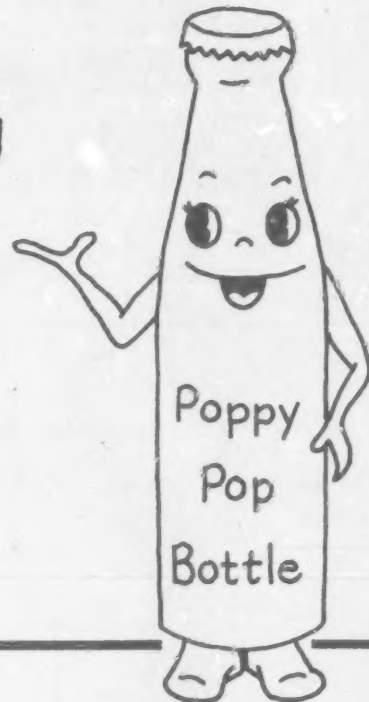
Words to know:

carton	money
factory	recycling
flavors	refund

grape

lime

orange



Can you color the blocks?

3

Hi! I am Poppy Pop Bottle.

I am happy.

Let us talk about me.



4

I am made of glass.

My pop is good to drink.

Yum! Yum!

I have a cap to keep
my pop fresh.



5

I come in all kinds of
flavors, such as
orange, grape
and lime.

Boys and girls like
my pop. They
drink it fast.

I am used over and
over again.



6

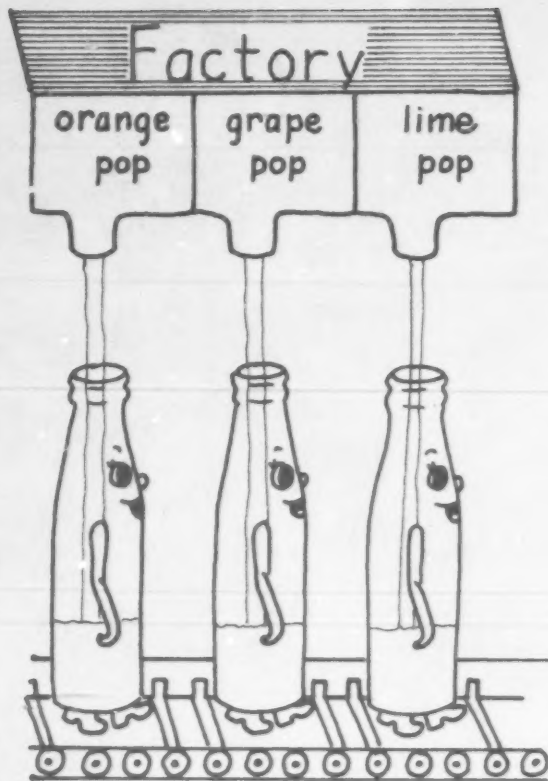


Yes, I am happy.

I am used over, and over
and over again. I can
carry pop drink many,
many times.

Let me tell you
how I do this.

7

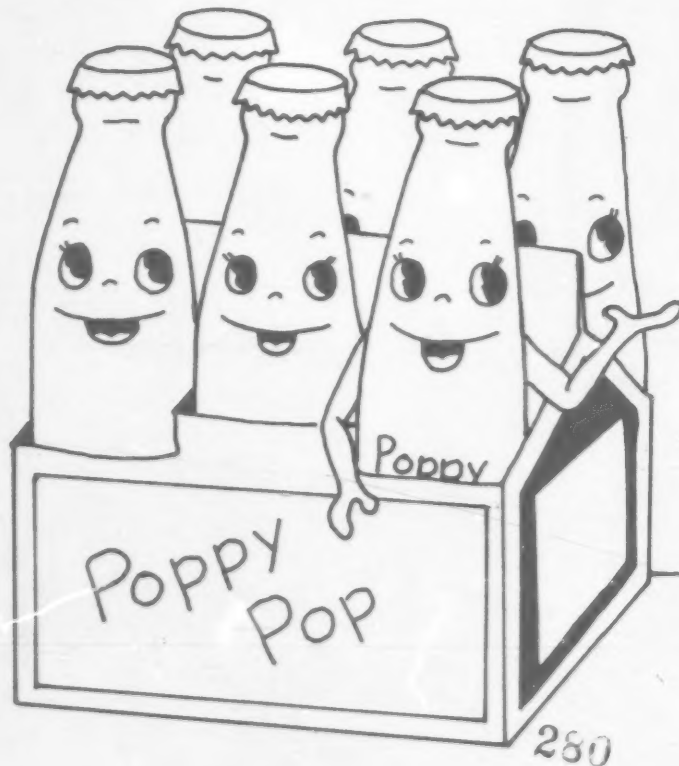


At the factory people make all flavors of pop. They put one flavor in me.

When I am full they put a cap on me.

← Can you color us ?

8



They put me in a carton so that I can be sent to the store.

They send me on a truck.

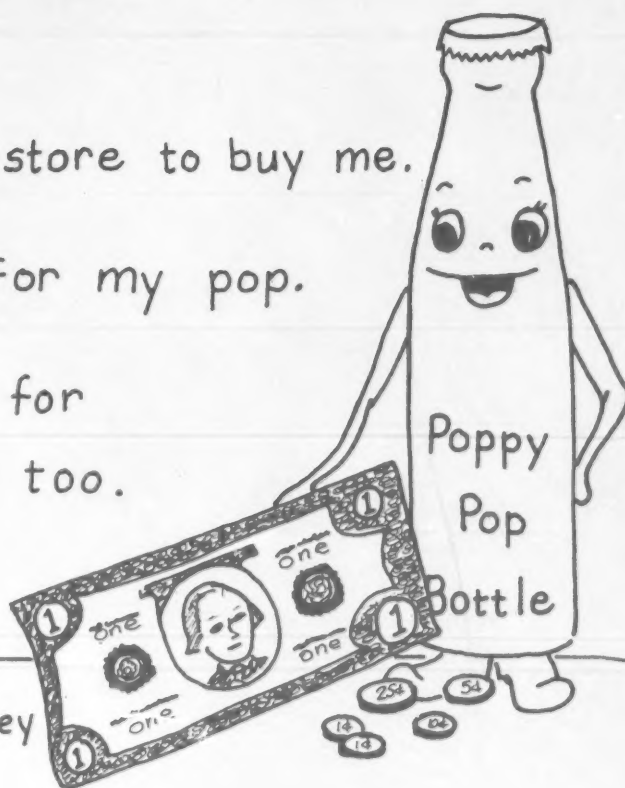
Can you color us ?

9

People come to the store to buy me.

They pay money for my pop.

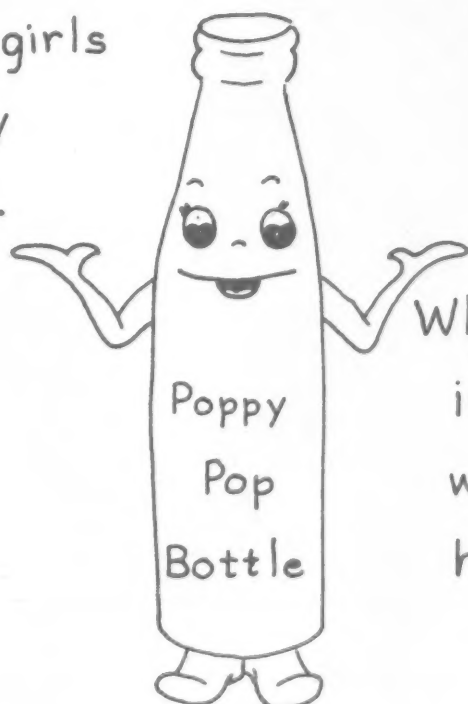
They pay money for
me, the bottle, too.



Can you color the money
and me too?

10

Boys and girls
drink my
pop fast.



When my pop
is all gone,
what will
happen to me?



All my pop is gone.

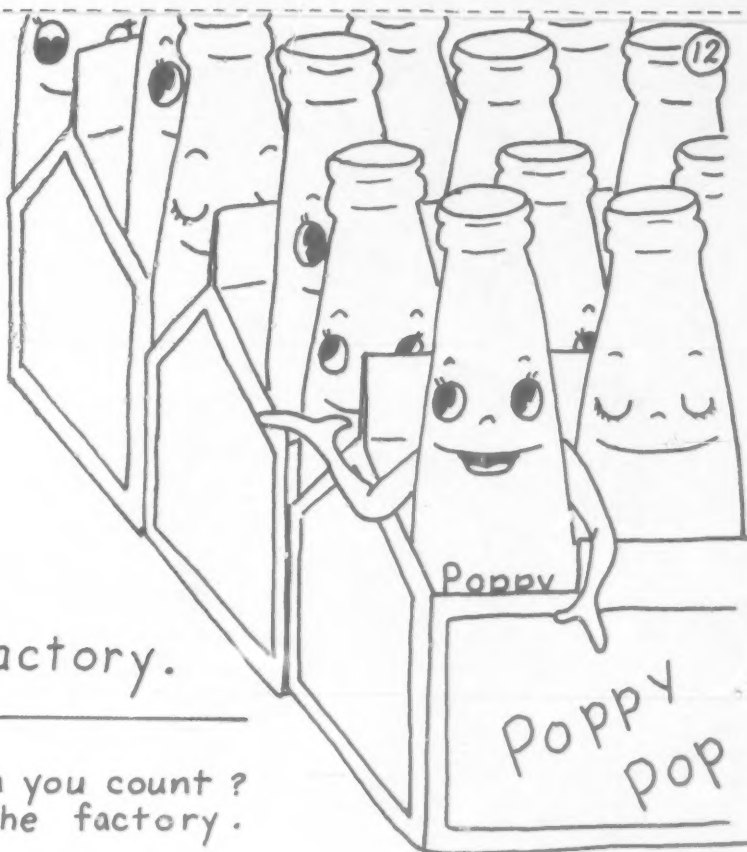
Boys and girls take
me back to the store.

They will get money
back for me.

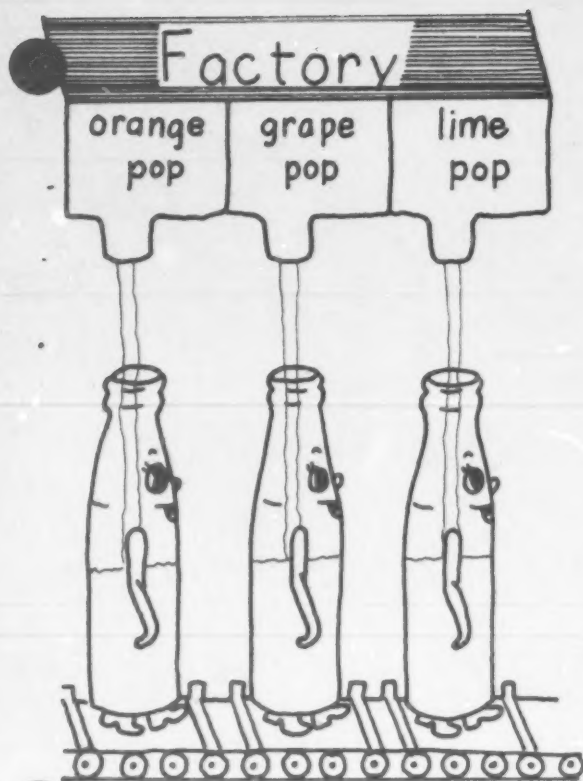
This is called a
pop bottle refund.

I am kept in the
store. A truck
will come to
pick me up.

I will go back
to the pop factory.



How many bottles can you count?
We will all go to the factory.



At the factory they
will wash me.

They will put more
pop in me.

Then I will go back
to the store to be
sold again.

Yes, I am happy
because I am used
over and over again.
I carry pop drink
many times.
This is called reusing.
Can you tell my



story?



JAN

The CAN

A Recycling Story

by Dan Grimes

Pictures by Chloe Poole

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Words to know : ①

factory
metal
shape
recycle
recycling



Hi! boys and girls.

I am Jan.

Let me tell a story.



I am a can.

I carry many
things. Can you
name some ?



4

I am made
in a factory.

I am made
of metal.



5

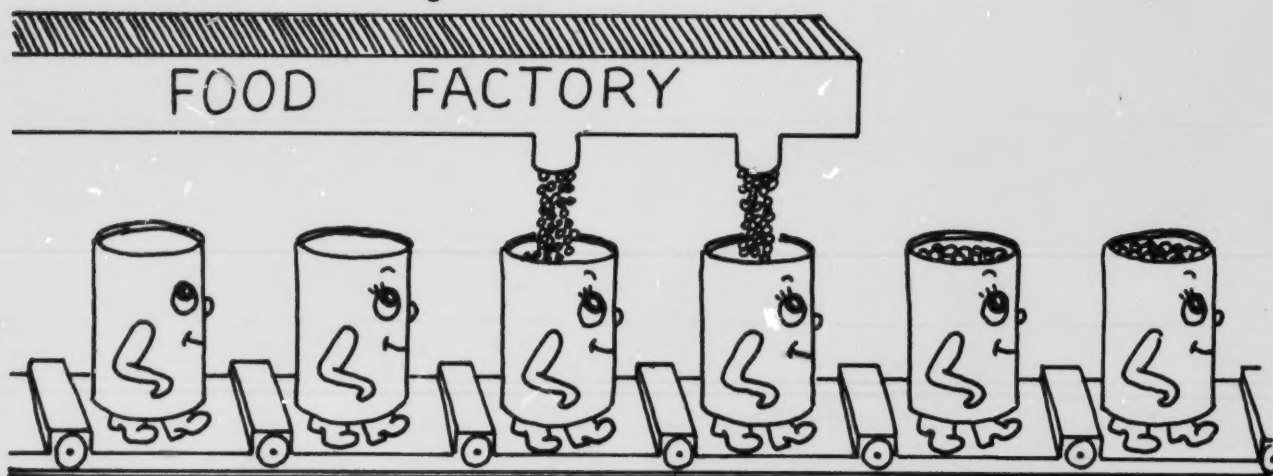


I am made
in many shapes.

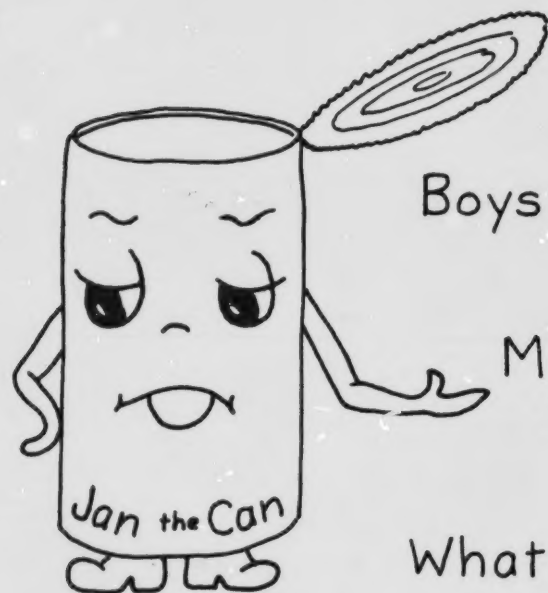
⑥

Sometimes food is put inside me.

Boys and girls eat my food.



⑦



Boys and girls like my food.

My food is all gone.

What will happen to me?

IMPACTS

⑧

Wow! I can be used
over and over again!

Let
me
show
you.

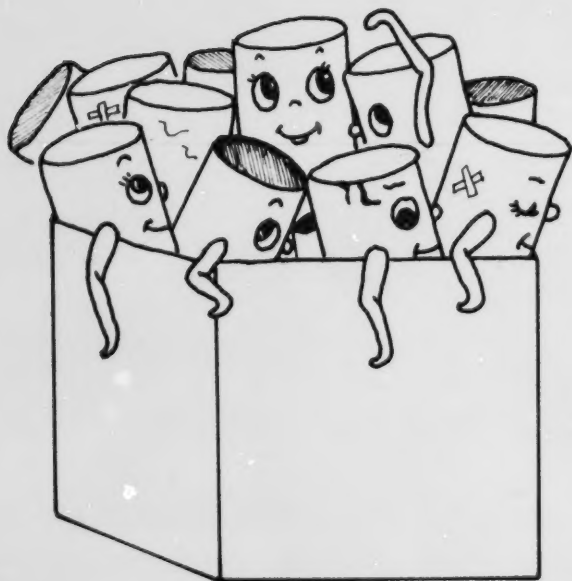


⑨

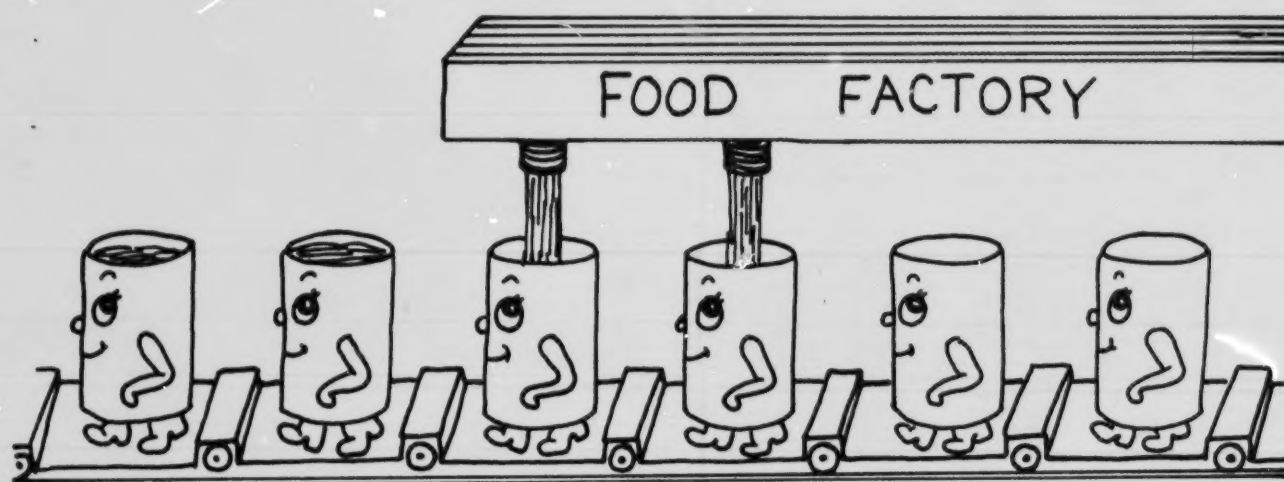
I can go back to the factory.

They would melt me.

They could make
me new again.



I am happy. They will use me again. They put food in me again. Boys and girls will eat my food.

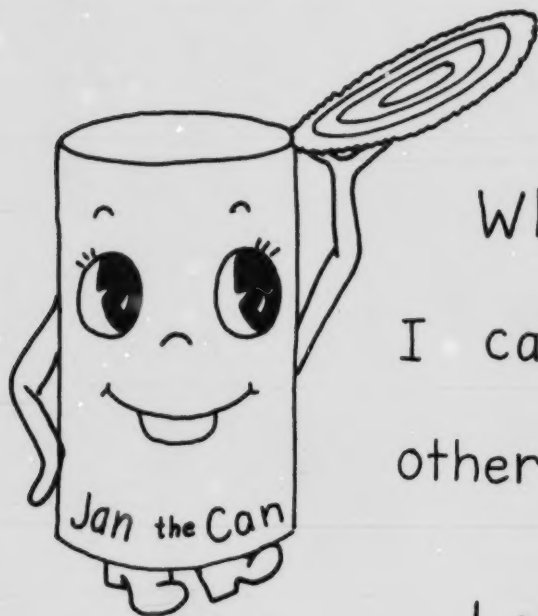


I am happy when I am used over and over again.

This is called

reusing





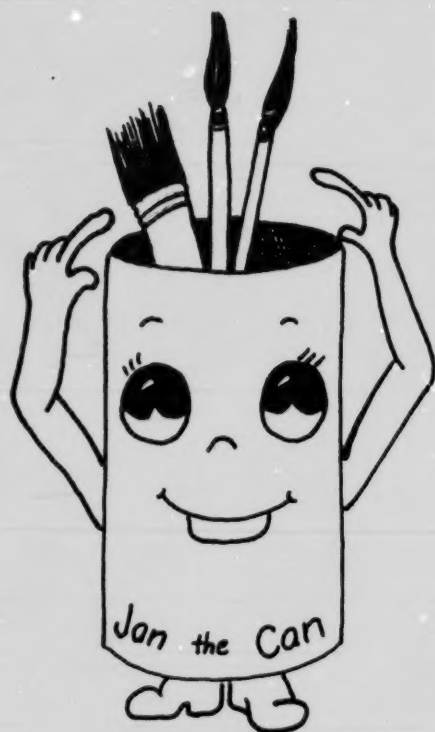
When my food is gone
I can be used to do
other things too.

Let me show you.

You can dress me up.
I will hold your
crayons. Keep me
in a desk.

I am happy.





I can hold a brush.

I am happy with a brush.



I can hold a tree.

I am happy with a tree.

I can hold a tack.



I
am
happy
with
a
tack.



I can hold lots of things. ⁽¹⁷⁾



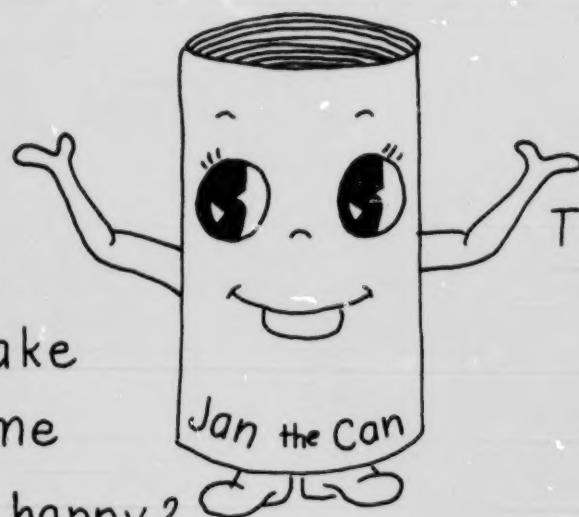
... a tree
... a brush
... a tack
... a crayon

I am happy !

I am happy when I hold things.

Now...

Can
you
make
me



happy?

Think of
something
I can
hold for
you.



19

I have many uses. I can be used
over and over again. This is called
reusing. Can you reuse me?



Try hard !!!

Basic

1

Objective: Student will be able to say orally or write a meaning of the word litter and give an example.

Activity: Sprinkle garbage in the hall of the school (waste paper, books, cartons, containers, clothes, old shoes, etc.).

Teacher observes and lists who notices or picks up litter.

Eventually discuss the problem of the litter in the hall and ask questions like these:

- A. How does the litter in the hall make you feel?
- B. What would it be like if no one cleaned it up and more was added each day?
- C. What rules would you make to keep the area clean?
- D. How is our problem of litter like the problem in communities?
- E. What rules would you make to keep the community clean?
- F. What do you think the word litter means?
- G. Let's make a list of kinds of litter we have in our community.

Extending

1a

Subject Content Areas: Science (classification of objects) observing, Decision making, Language Arts, Language experience charts (teacher writes what students say), Creative drama, Art.

Activity: Take your students on a short walk around the school yard and surrounding area near roads. Make a collection of different kinds of litter they see. Bring to classroom and make a display and then decide what to do with your collection. Explore alternatives and select best one by vote.

Stress the idea that recycling waste helps to reduce litter. Also that some people and factories reuse such things as newspapers, bottles, and cans to help reduce litter and waste. Point out that it takes a lot of hard work to carry out a litter and recycling campaign!!!

Objective: Creative drama

Activity: Have students act out the part of a piece of litter.

Suggestions: Dress up like litter. Have litter coming out of actors' pockets, shoes, dress, shirt, hands, hair, etc.

Presentations can be in the form of pantomime or charades.

If dialog is desired have students make up a script or do impromptu: "If litter could talk, what would it say?"

Extending 1c

Objective: Creative art

Activity: Have students draw and color pictures.

Subject areas could be:

- a. your litter walk
- b. your litter display
- c. litter classifications
- d. litter seen in the community
- e. litter seen on vacations

Activity: On one half of the paper have students draw and color a picture of a landscape that is polluted with litter. On the other half, have them draw and color a picture of a litter-free landscape. Have a discussion about both pictures. Which is better? Why?

Extending

2

Objective: The student will be able to describe what role retail grocery stores play in recycling bottles and be able to list three jobs at the store.

Activity: Take the students to your local supermarket or grocery. Have the store manager give you a tour of the area where returned bottles are stored. Ask the manager to explain the deposit-refund process. Ask him to explain the storage-pickup-delivery system. If possible, try to schedule your visit on the day the bottles are picked up by the distributor.

Discuss what recycling means.

Culminating

2a

Objective: Creative art - Language experience - Career awareness

Activity: Have your students draw and color a picture of your trip to the grocery store. Show the workers you saw, the bottles being returned and stored, and/or the truck that picks up the bottles. Have the students share the pictures with the class.

You can also use the student drawings for Reading. Have the children tell a cooperative group story about a picture. As they tell you what to write put the story on the board for them to read.

Basic

3

Objective: The student will make a poster, collage or mobile using litter as the working material.

Activity: Have the students go on a litter drive around the school and/or community. With this litter have them make posters, collages or mobiles that depict the types of litter that exist, as well as showing how litter hurts the scenery.

Make up slogans to put on the art work.

Display the work around the room, school and community.

Stress the aesthetic value of the environment and how litter destroys its beauty.

Extending

4.

Objective: The student will be able to list ways a milk jug may be recycled or reused.

Activity: Bring to class a glass milk jug. Discuss with your students how the jug is or might be reused. Stress the idea that many people who buy milk prefer to use glass jugs because they are reused by the dairy. Tell the students that if we buy milk in returnable containers, there will be fewer milk cartons to throw away and therefore, less waste and litter.

Discuss with class what recycling means.

Subject Content Areas: Career Awareness, Art, Reading, Language, Creative Drama.

Activity: Have your students draw and color pictures of the milk jug being used for different things or how it might be used again as a milk container.

Use their pictures for a language experience. Have the student dictate a story to you. Attach it to his/her picture for him/her to see and read.

Have students act out the uses of a milk jug. They could do this in pantomime or with puppets.

Objective: When given a variety of materials the student will decorate used bottles and list several ways they can be reused at home or at school.

Activity: Have the students bring used bottles to school. Using decorating material such as paint, yarn, art paper, contact paper, stick-ons of all kinds, cloth, etc., decorate the bottles. Have the students make a list of all the ways they will use the bottles at school or at home. Discuss the idea that you are recycling the bottles by using them over again.

Suggestions: You can make flower vases, planters, puppets, storage containers, etc.

Subject Content Areas: Art , Language Arts

Activity: Have the students draw and color a picture story of where and how they intend to use their decorated bottles.

Using the picture stories the teacher can write student-dictated sentences for reading.

Students may get oral language experience by telling the story they have illustrated.

Objective: The student will be able to describe how a beverage manufacturing plant recycles their own bottles for reuse and will be able to list at least three jobs involved.

Activity: Take your students to a local beverage plant for a field trip. (This could include plants that bottle catsup or other cooking items.) Have students observe a recycling process. Also observe the various jobs found in the plant.

When you get back to the classroom, discuss and/or draw pictures of your trip. Discuss what recycling means. Discuss the careers you observed.

Objective: The students will demonstrate an understanding of factory work and workers.

Activity: Have your students simulate a pop bottle factory with assembly line work. Student stations could be (a) unloading empty bottles; (b) washing the bottles in a small dish pan; (c) drying the bottles; (d) filling the bottles with colored water; (e) putting a plastic cap on the bottles; (f) packing them in paper cartons; (g) stacking them in the "ware house" part of the room; (h) delivery to the classroom "store"; and finally sales to the consumer. Then the second phase begins with (A) the buyer; (B) the user; (C) return to store for refund; (D) store sorts and stores; (E) return bottles to factory area to begin cycle again.

.....see card 6b.

Subject Content Areas: Career Awareness; Creative Dramatics; Social Studies; Art.

Activity (cont.) Divide the class into small groups. Each group has one of the special jobs mentioned. (Division of Labor) Start at the factory and keep going until all bottles have made the complete cycle at least once (or more).

Materials suggested: Four six packs of empty bottles or more. Paper cartons for bottles. Corks or plastic caps for bottles. Water and food coloring. Soap, dish pans, towels. Play money.

Signs for your stations will help. Students could make these.

Subject Content Areas: Art , Language Experience

Activity: Have students draw and color picture stories of the factory building , how bottles are filled , and people at work. Be creative. OR... Have them draw themselves at work in your simulation experience.

Have the students tell the story of the pictures. Write the story or tape it for all to see, hear, and/or read.

Have them tell: how it felt to work as a team to complete the full cycle; how it felt to do the same job over and over; were they able to do it better or faster with experience? ; etc.

Objective: The student will be able to describe what role a newspaper recycling center plays in recycling paper. He/She should be able to tell about one job at the center.

Activity: Take your students to a local newspaper drop. Arrange for the manager to describe the process of recycling the papers. Have him/her explain:

- a. who brings the papers to the drop?
- b. who bundles and sorts the papers?
- c. where and how the papers are shipped.
- d. how the papers are reused.

On return, discuss what you saw and heard. Discuss what recycling means and why it is important. Draw pictures of your trip.

Objective: The student will be able to tell ways an egg carton can be reused.

Activity: Bring an egg carton to class. Discuss with your students how that egg carton could be reused rather than thrown away. Make a list on the blackboard. Discuss the word recycling.

Have the students reuse egg carton in a class project for something that can be used at school or at home.

Egg cartons can be decorated as storage boxes, made into egg cup puppets, soaked down to make egg carton papier mache', used as base for the Math game "KAHLAH", etc. Be creative!

Objective: The student will make up environmental management rules for the classroom.

Activity: Discuss with the class the rules people should follow concerning litter. Why are these rules important? Make up rules the class will follow about classroom litter and recycling that litter. Try to state the rules in positive terms rather than negative. Decide what the consequences will be if the rules are not followed. Point out individual responsibility and team effort. Elect a class enforcement officer. Court cases may arise. Have a court session if necessary. Invite a policeman to come to class. Ask about litter and recycling laws. What is the importance of these laws? How are they enforced? What do people need to know about them? How can the class help?

Subject Content Areas: Language Arts, Social Studies, Art, Career Awareness

Activity: Have a Poster Campaign to stamp out litter in your school or community.

Develop a spelling-vocabulary list of words to use. Work together to develop some short, simple, slogans. Discuss some impact, attention getting, posters for ideas.

Contact local business people for permission to display your posters. Study the school for the best and most visible places for display there.

Make simple posters concerning litter elimination.

Objective: The student becomes aware of how people reuse and recycle products.

Activity: After your students understand the concepts of litter and recycling, discuss with them the idea of interviewing adults in the school and community about the ways they recycle or reuse waste products at home or on their jobs. Have students share with the class the information they collect. Keep a wall chart. List each new idea as well as data on the most common practices.

Discuss the outcome of your survey. Are most of the people interviewed really practicing recycling? Did you get many new ideas? What else did you learn?

Objective: The students will become actively involved in the recycling process.

Activity: Make a plan with your students for a paper drive. Check with your County Extension Agency for information. Check with places that accept paper collections. At times you can make money for each ton of papers. Arrange with your school custodian for suitable, temporary storage.

Have your students collect newspapers in the community and bring them to school. When your stock is large enough, arrange for pickup by the recycling center or firm buying your paper.

Many math activities can be based on this project.

Objective: The students will become actively involved in the recycling process.

Activity: Take your students on a returnable bottle hunt. Bring the bottles back to school. Have the students figure how much the bottles are worth. Take the bottles to your local store for the refund. Make a class decision on how the money will be spent.

Observe the areas of the community on the hunt. Are some places more prone to collect litter than others? Why? Make some comparisons. Record your data.

Objective: The students will become involved in recycling at home.

Activity: Have the students discuss with parents the idea of recycling newspapers, bottles and cans. Encourage them to try to set up a program at home for recycling. Have students report their progress. Keep a wall chart or other record system for a period of time. Continue positive reinforcement of the concepts. Encourage participation in the project until new habits are formed.

Note: It might be a good idea if the teacher sends a note home explaining to parents that the child is involved in recycling activities at school.

Objective: The student will observe that newspapers, if prepared properly, can be reused to control weeds in places where weeds are not desired.

Activity: Bring to class a clump of weeds potted in soil. Place newspaper completely over them. Observe intermittently to see what happens to the plants although they are properly watered. The students should observe that the plants will lose their color and eventually die. Discuss why this happens.

Discuss that people could use this method to control weeds in flowerbeds and other planted areas. Holes can be cut or left for the desired plants. A covering of rock, gravel, bark dust, bark chips or clippings and mulch will hold it in place.

Objective: When given a variety of materials, the student will decorate used cans and list several ways the decorated cans can be used at school or at home.

Activity: Have students bring used cans of all sizes to school. Using decorating materials, refurbish the cans. Have the class make a list of ways they might use the cans at school or at home. Discuss that you are recycling. How are you helping to reduce potential litter? Have each student share how his can will be used.

Suggested Materials: yarn, cord or string; contact paper; art paper; gift wrap; cloth; colored comics from newspaper; used greeting cards; paint; etc.

Extending

15a

Subject Content Areas: Art, Math, Language Arts

Activity: Have each student make a picture book recording the step-by-step activities in decorating a can for reuse. Have the final picture show how the can will be used.

Have the students figure how many pages they will need, what size the paper will be, how much time they spend on the activity and how to use curved lines and straight lines to draw the can.

During Reading have the students tape record a story to go with the books. Listen to the story to see if each step was covered. Revise and re-tape if necessary.



Objective: The student will start a recycling center in the classroom.

Activity: Develop a waste paper recycling box for the classroom.

Have the students decorate a big box and label it "Recycling Box". Have the students put all their waste paper in it. When the box is full, separate the paper into these groups:

- a. art paper - colored
- b. lined papers
- c. newsprint
- d. paper with crayon marks

Tie each group into a bundle. Call your paper recycling center and ask which paper group they will take. Take the paper to the recycling center when you have enough bundles.

see Card 16a.....

Extending

16a

Continued...

Reuse the art paper scraps for additional art projects.

Have students make up class rules for the use of the recycling center. Decide what happens when the rules are broken. Elect a student recycling manager.

Have your students share their recycling ideas with other grades.

If you do not have a recycling center near you, decide what to do with your paper. What are your alternatives? Explore! Make a decision based on your choices. If you decide to have the custodian dispose of it, ask him/her to come and tell you what happens to it. Is that the best solution? If not, why?

Activity: See the film: "Litter Monster" 16 min., Color
(Higgins, 1970) for primary

Construction of a litter monster by young people focuses attention on the need for litter prevention. Explains how litter destroys beauty and how clean-up activities could be utilized.

Make a classroom litter monster to hold recyclable items such as paper, bottles, cans, etc. Recycle the items.

Make Litter Monster bags. Have students design big shopping bags with handles. Have the students use the bags for their recycling projects at home. When they are full they can be taken to a recycling center.

Objective: The student will be able to tell orally, write and/or draw the meaning of the word "recycling".

Activity: After the students have completed activity cards 2, 4-16, 18 and/or 23 have them define "recycling". Write the definitions on butcher paper for display.

The students could draw and color illustrations for the definition poster.

Objective: Given a paper bag the student will reuse it for several consecutive days.

Activity: Practice recycling and conservation. Have the students bring a paper bag to school. (You may wish to decorate them.) Discuss all the ways the bags could be used. (Examples: lunch sack, carry papers home, bring items to share, store crayons, etc.)

Have a contest to see who can keep the same bag in use the longest. Keep a chart. Who found the most uses?

Stress the point that this activity may be called recycling. Discuss how reusing products can save money and reduce litter.

Extending

19

Objective: The student will be able to make a decision and justify his position concerning a recycling problem.

Activity: Pose a problem to the class, asking each to be ready to explain his solution and the reason he chose that solution.

Situation: A child, drinking a bottle of pop, was riding a bike home from the store. When the pop was gone, the bottle was tossed into the ditch at the side of the road. You saw this happen. What will you do?

- Pick up the bottle and return it for a refund.
- Call the child back to pick it up and return it to the store.
- Tell the parents what happened.
- Leave it there and ignore it.
- OR.....

What would a policeman do?

Objective: The student will be able to express his opinion about recycling problems.

Activity: Initiate discussion with these questions;

1. Should people be required to recycle products such as bottles, newspapers and cans? Why? OR Why not?
2. What happens to the environment when people do not recycle?
3. What happens to products that are recycled?

Objective: The student will be able to argue convincingly to support his position.

Activity: Show your students an object, such as a paper clip, bottle cap or half-used pencil. Try to convince the class that the object is worthless to anyone. Encourage the students to try to convince you that it has value and could be used or reused for some purpose.

Objective: The student will be able to present a convincing position statement.

Activity: Have the students bring something to class that they think is totally worthless to anyone. Next, have the student prove that it is worthless. Have class discussion.

- a. Was it easy to find a worthless item?
- b. Where did you find it?
- c. Could it be reused for anything?
- d. Should it have been made in the first place?
- e. What will you do with it now?

Objective: Students will become aware of conservation practices.

Activity: Show the class a newspaper. Have them tell you all the things the newspaper can be used for. As you list them on the board, ask them to give reasons for their answers.

Next try a glass bottle
plastic container
card board container
paper sack
egg carton etc.

Can these products be reused many times rather than thrown away?

Activity: Have the class read the "Poppy Pop Bottle" story. Discuss these questions with your students:

- Why do you think people recycle pop bottles?
- What might happen to all the pop bottles if they were not recycled? (litter, broken glass, etc.)
- What reasons do you think there are for putting pop in glass bottles rather than material like milk cartons?
- Do you think there should be laws telling people and factories to recycle pop bottles? Why? OR Why not?
- Are there other ways to recycle pop bottles?



Have the students act out the "Poppy" story. They could make pop bottle masks or puppets.

Have them make their own picture books about a pop bottle and recycling.

Activity: Have the class read the story, "Mrs. Newspaper".

Discuss these questions with the students:

- Why do you think people recycle newspapers?
- What might happen if newspapers were not recycled?
- Do you think there should be laws telling people and factories to recycle newspapers? Why? OR Why not?
- Can you think of other ways to recycle newspapers?



Act out the story of "Mrs. Newspaper".

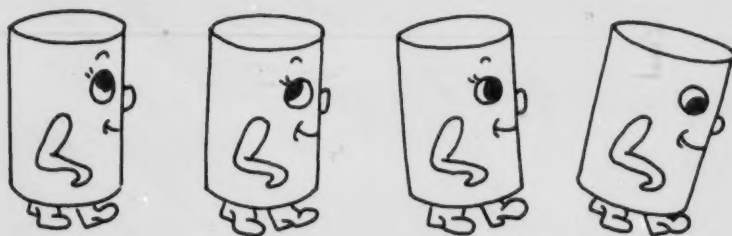
Dress up in newspaper costumes and act out the recycling process.

Have the students make their own picture books about newspapers and recycling.

Activity: Have the students read "Jan the Can".

Discuss these questions with the class:

- Why do you think people recycle cans?
- What might happen if all the cans were never recycled?
- Do you think there should be laws forcing people and businesses to recycle cans?
- Can you think of more ways to recycle cans?



Extending

25a

Activities: Have the class act out the story of "Jan the Can". Make costumes as necessary to your method.

Have the students make their own picture books to illustrate the recycling of cans.



LIMITS OF ENERGY

GOAL:

IT IS ESSENTIAL THAT EACH
PERSON KNOW THAT THE EARTH'S
RESOURCES ARE LIMITED.



ACTIVITY
DESCRIPTION PAGE
LIMITS (1-3)

GOAL: It is essential that each person know that the earth's resources are limited.

Concept: All sources of energy are limited; most can be used only once.

Activity #1 "A Letter To Roy The Oil Boy"
Grade level 2-3 Time: 5 - 30 minute sessions
Language Arts

Given the opportunity to read, discuss, and solve the problems in "A Letter from Roy the Oil Boy," the student will determine that oil is limited.

Activity #2 "Water - A Most Precious Resource"
Grade level 3 Time: 2 - 30 minute sessions
Science, Art

Given the opportunity, the student will be able to demonstrate one finite resource of the earth in four (4) ways: experiments, drawings of water cycle, poster/slogan, discussion of material.

Activity #3 "My Story About Coal"
Grade level 3 Time: 4 - 30 minute sessions
Language Arts

Given the opportunity, the student will write a story book about coal illustrating its limits and the need for conservation.

Activity #4 "How Long Will It Last?"
Grade level 1-2 Time: 7 - 30 minute sessions
Science

Given the opportunity, the student will observe the depletion or limits of several common energy sources.

Concept: Limitations may be viewed as relative to changing energy demands.

Activity #5 "What Could You Do Without?"
Grade level 1-2 Time: 2 - 30 minute sessions
Language Arts, Art, Career Awareness

Given the opportunity, the students will identify at least two energy-consumptive devices that they might choose to eliminate.

Activity #6 "The Generous Garbage Collector"
Grade level 1-2 Time: 2 - 30 minute sessions
Science, Social Studies

Given the opportunity, the students will identify at least three things in their home that could be reused which are now wasted.

title: "A Letter To Roy The Oil Boy"



limits



concept: All sources of energy are limited; most can be used only once.

objective: Given the opportunity, to read, discuss, and solve the problems in "A Letter from Roy the Oil Boy," the student will determine that oil is limited.

time: 5 - 30 minute sessions

subject matter area: Language Arts

grade: 2-3

implementation:

- Activity:
1. Attached is the story "A Letter from Roy the Oil Boy." Run off enough copies for students to read and discuss with the teacher.
 2. Write the following words on the board and practice them before reading the story together:

Roy	oil
solve	squeak
important	remember
afraid	empty
limited	yourself
scientists	recycle
 3. Read and discuss the story. Have the students solve each problem in the letter.
 4. When the class is finished with the story, ask them questions.
 5. Have the students rewrite the letter or one like it in their own words.

materials:

Crayons or colored pencils.



implementation:



Activities: 6. Have the students write a letter back to Roy the Oil Boy. Make arrangements to have older students in the fifth or sixth grade answer their letters.

SUGGESTED CAREER AWARENESS ACTIVITY:

List jobs of people who work in an oil-related job. Have students draw pictures of these workers doing their jobs, showing their clothes and tools.

materials:



SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will read, discuss and help solve the problems in "A Letter from Roy the Oil Boy."

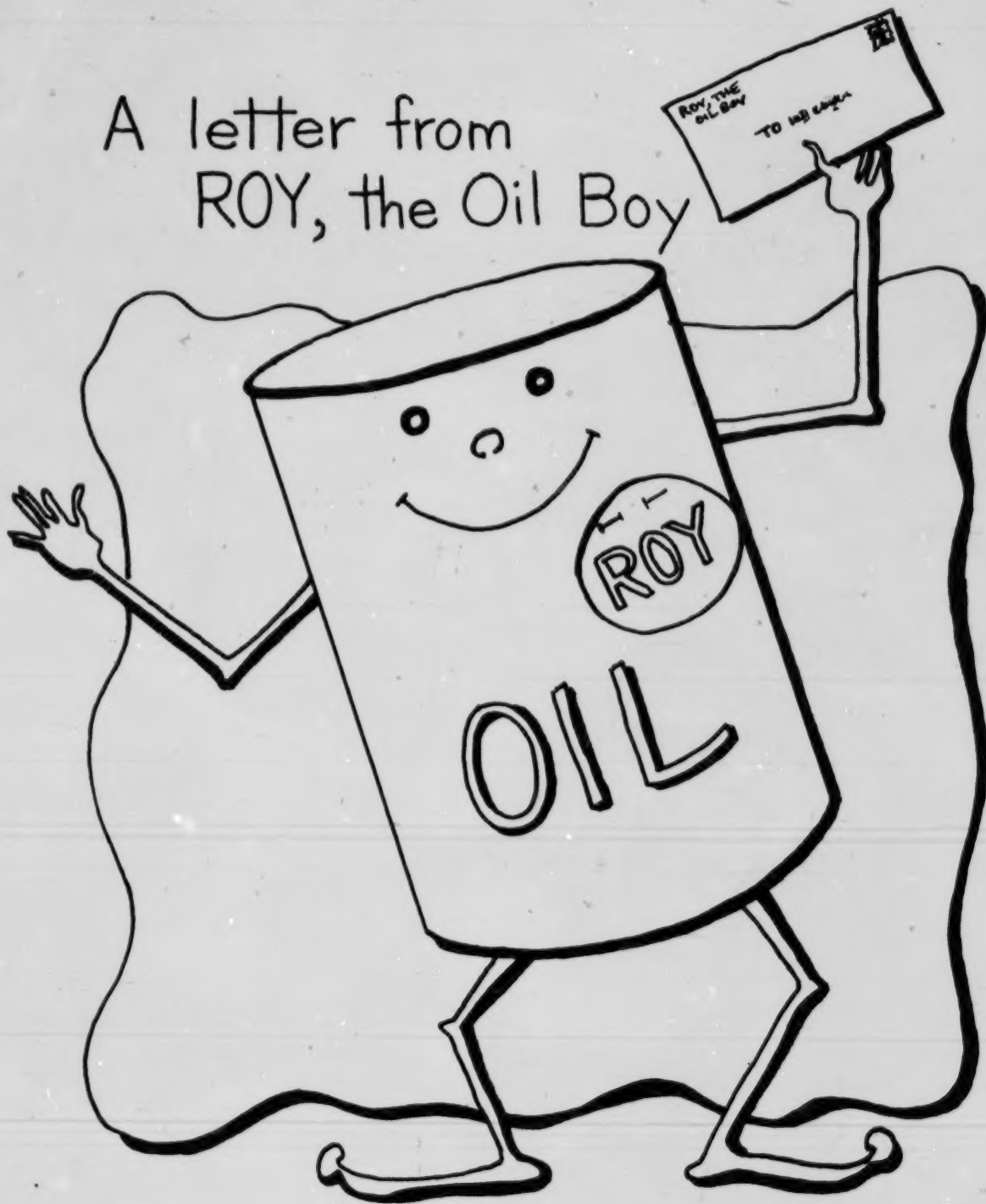
Developed by: Dan Grimes
EME

ROY, THE OIL BOY

**Coloring
Book**

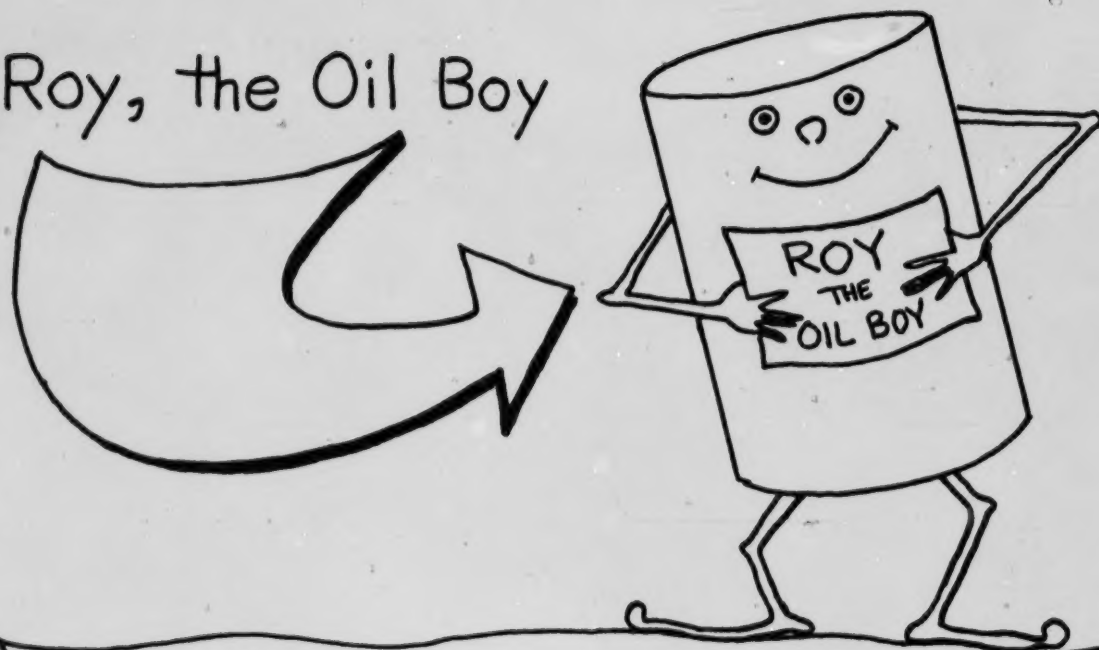
STORY BY DAN GRIMES — ILLUSTRATED BY O. GOSNELL

A letter from
ROY, the Oil Boy



Can you solve the problems
in the letter?

Roy, the Oil Boy



page 1

Dear Boys and Girls,

Hi! I am ROY, the OIL BOY.

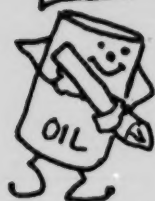
People use my oil for many things.

I am burned to give heat. I am

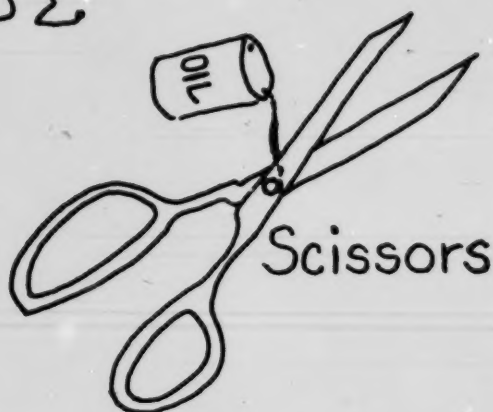
used in cars. I am used so that metal
parts will not squeak and wear

out. I am very important to people.

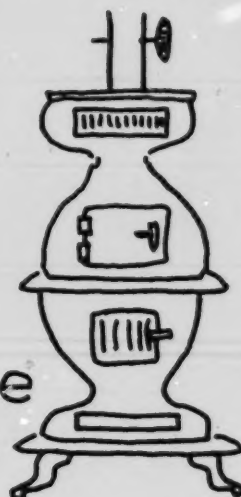
I hope you will remember some ways my oil is used. My oil is used for many, many things. I am very important.



Color the pictures below.



Scissors



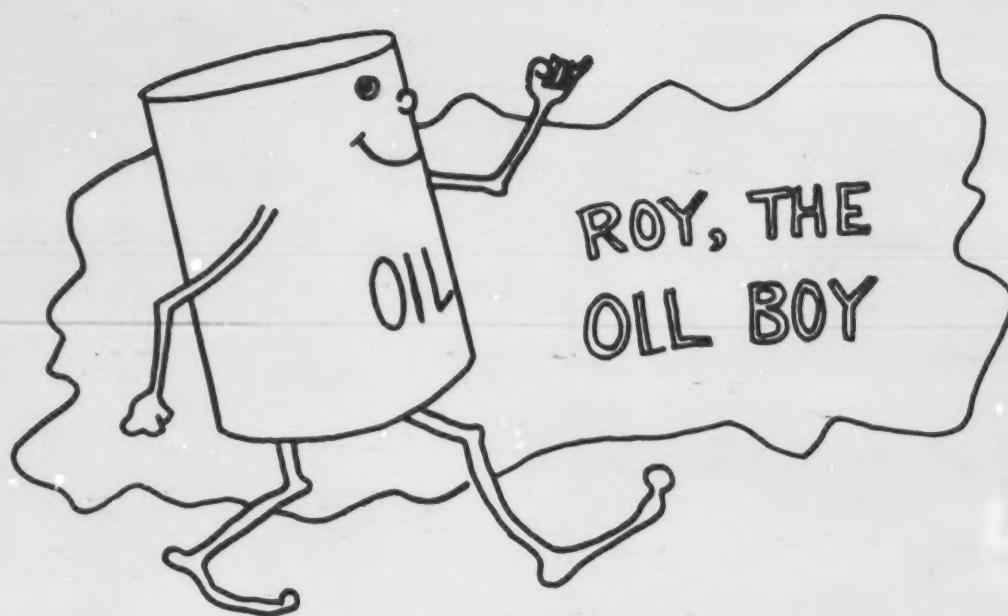
Stove



Bike



How many pictures above? _____



Make a list of the things with which you have seen oil being used. Can you name five (5)? Can you name more than five?

One_____

Six_____

Two_____

Seven_____

Three_____

Eight_____

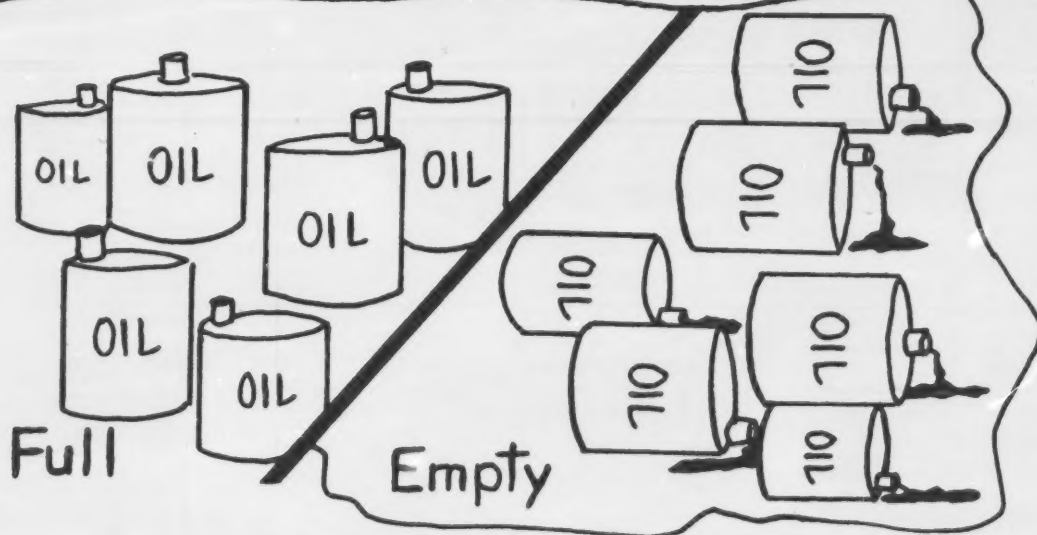
Four_____

Nine_____

Five_____

Ten_____

If people use too much of my oil it will run out. My oil will be gone forever. People need my oil. I am afraid that my oil will be used up. People may be sad.

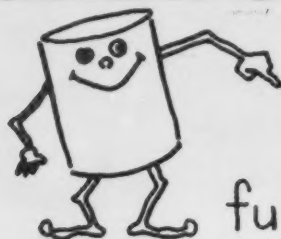


Count the full cans of oil _____

Color the full cans of oil black.

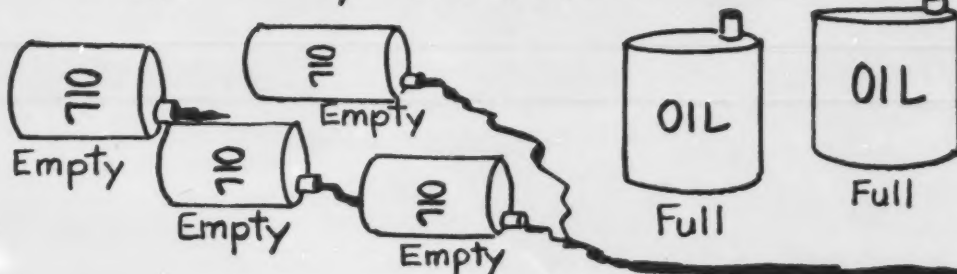
How many full cans of oil are left in the second picture? _____

Do you remember what happens
to the oil? _____

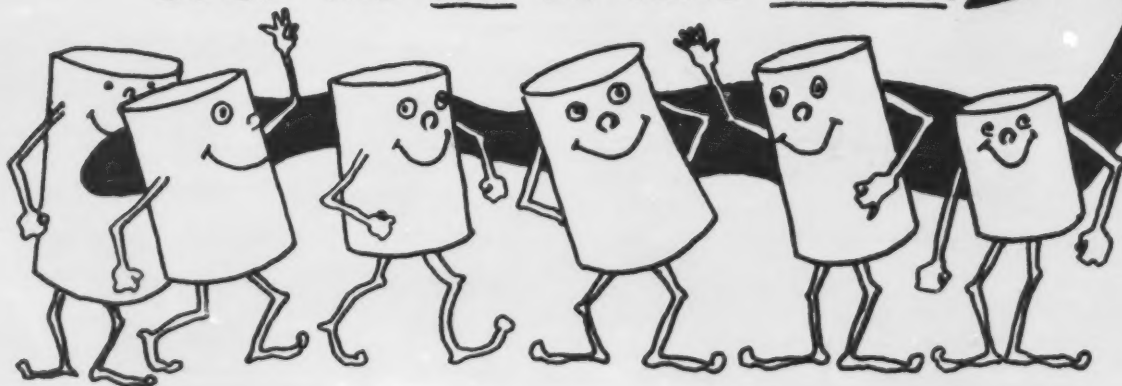


Do you remember how many
full cans of oil were left in the
first picture? How many? _____

How many are left now? _____



Color the full oil cans black.

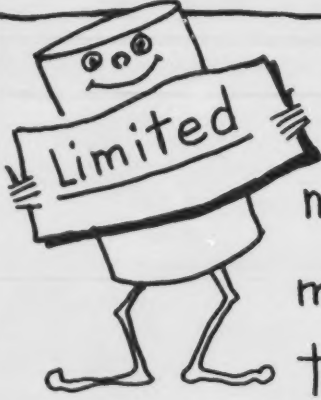


Why are there some empty cans?

(Turn this page upside down to check your answer.)

If you said that there are empty cans because people used my oil for many things - you are right!

page 4



My oil is limited. This means that there is only so much oil in the world for people to use. When my oil is all used up it will be gone forever.

Draw in the letters



limited

What is the big word that means
only so much? _____



Can you say this word?

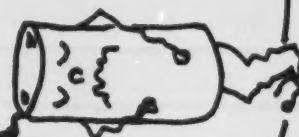
Try to spell it by yourself now.



I do not want my oil to be all used up.
Here are a few ideas that will help save
my oil:

page 5

1. Do not waste oil.
2. Use oil only when you need to.
3. Use the same oil longer.
4. Turn the heat down in oil stoves and
furnaces.
5. Find something new to replace oil.
(Scientists do this)
6. Find more oil in the ground.
(Scientists may do this)
7. Reuse the same oil over and over
again. This means to recycle used oil.





If people will try these ideas my oil will last a long time. That would make me very happy!! You have learned ways to help save my oil. My oil will last longer if people will help.

Thank you,

Roy, the Oil Boy.

P.S. Can you write my letter in your own words? Will you write me a letter?

Name as many of the ideas to save oil as you can. _____





title: "Water - A Most Precious Resource"



limits



concept: All sources of energy are limited; most can be used only once.

objective: Given the opportunity, the student will be able to demonstrate one finite resource of the earth in four (4) ways; experiments, drawings of water cycle, poster/slogan, discussion of material.

time: 2 - 30 minute sessions

subject matter area: Science, Art

grade: 3

implementation:

- Activity:
1. Give each child a paper cup about 1/2 full of clean water.
 2. Discuss word "finite" by talking about the water in the cup. No more can come in. This is all you can have.
 - a. What would you do with your water?
 - b. How many ways could you use it and still keep it inside the cup?
 - c. What would happen to your water?
 3. Relief map: Pour water in low areas, likening to oceans and rivers.
 4. Relate to globe and earth. Show vocabulary words on board.
Water cycle
Finite
Resources
Pollution
 5. Show a good film on water pollution.
 6. Show water cycle on overhead.

materials:

Film on water pollution
Transparencies
Film strip
Paper cups and water
Relief map
Globe
Art paper, crayons
Poster paper
Chalk and board



WATER CYCLE
FINITE
RESOURCES
POLLUTION

activity no. 2

implementation:



- Activities: (cont.)
7. Show National Geographic filmstrips on water pollution, or others available on water pollution.
 8. Have the students make their own drawing of the water cycle.
 9. Have a poster contest for best poster/slogan showing that water of our world is finite.
 10. Choose five people to treat their water in five various ways (their choices). If there is enough left, see if they want to drink it after treatment.

SUGGESTED CAREER AWARENESS ACTIVITY:

Visit a water treatment plant to see the various jobs being done and to interview the workers about their jobs.



materials:



SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will demonstrate that water is a finite resource by doing experiments, drawing a water cycle, and by making a poster.



Developed by: Norene Page
Weber School District
Weber, UT

Revised by: Dan Grimes
EME

title: "My Story About Coal"



limits



concept: All sources of energy are limited; most can be used only once.

objective: Given the opportunity, the student will write a story book about coal illustrating its limits and the need for conservation.

time: 4 - 30 minute sessions

subject matter area: Language Arts

grade: 3

implementation:

- Activity:
1. Note: This is a follow up lesson. The teacher should be aware of the story book "A Letter From Roy the Oil Boy" found in this learning package and have completed that learning unit with the students before attempting the objective outlined in this learning activity.
 2. To help facilitate the students' assignment, show film, "Coal: A Source of Energy." After seeing the film, the students should refer to the "Sources" section of the learning kit and review the "Sources of Energy Coloring Book" for their background information.
 3. After the students have studied the story of "Roy the Oil Boy," have seen the film on coal, and have reviewed the "Sources of Energy Coloring Book", they will be ready to begin their own story about coal.
 4. After the students have completed the story book "A Letter From Roy the Oil Boy", have them create their own story books about the following:
 - a. Coal resources are limited.
 - b. People use large amounts of coal for electricity, stove and furnace heat.
 - c. People need to conserve coal.

materials:

Lined newsprint
Primary paper

Film:

"Coal: Source of Energy," 15 minutes, color, McGraw-Hill 1967.



equipment:

16mm projector



activity no. 3

implementation:



Activities: 5.
(cont.)

NOTE: During the activity, the teacher should stress the importance of coal conservation and list ideas the students could use in their stories.

SUGGESTED CAREER AWARENESS ACTIVITY:

Include drawings of workers in the coal industry in stories and books. Have the students find out what tools are used by these workers.



materials:



SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will describe the story of coal in a creative story.



Developed by: Dan Grimes
EME

title: "How Long Will It Last?"



limits



concept: All sources of energy are limited; most can be used only once.

objective: Given the opportunity, the student will observe the depletion or limits of several common energy sources.

time: 7 - 30 minute sessions

subject matter area: Science

grade: 1-2

implementation:

- Activity:
1. Flashlight energy: Turn the flashlight on and leave it on until the energy is used up. Have the students estimate or predict how long they think the energy in the batteries will last. Relate this investigation to the idea that the electrical energy in the batteries will last only a certain amount of time. The energy is limited.
 2. Candle energy: Using a small birthday candle have the students observe and estimate how long the candle will burn, giving off heat and light energy. Again, relate this investigation to the idea that energy stored in the candle will last only a certain amount of time. The energy is limited.
 3. Food energy: Distribute sugar cubes to the class, one per student. Tell them to conserve it as much as possible and see if they can make it last for a couple of days as this is the only cube they will receive. At certain times during the day, have the students lick or nibble their cubes. Relate the activity to the fact the food energy the sugar has is limited. (It will last only so long until it is gone.)

materials:

Flashlight and batteries
Candle
Sugar cubes
Raisins



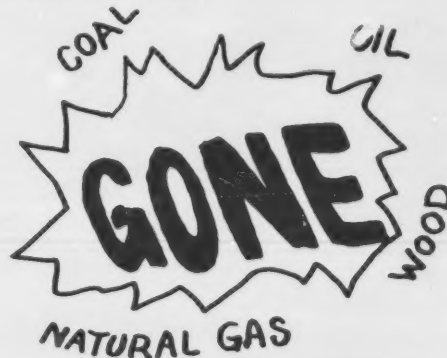
implementation:

Activities:
(cont.)

- a. Teacher should display a bowl of raisins in front of the room. Tell the students that they are going to experiment with raisins by eating them. Also, tell the students that they must see if they can make the raisins last for several days. Explain to the students that the supply is limited. When they are gone they will not be replaced. Instruct the students by telling them that at anytime they want a raisin to feel free in eating one. An honor system will determine how long they will last. Discuss with students the term limited and its implication to the earth's energy resources (i.e. resources are limited or finite).
5. As a summary, discuss with the students the meaning of "limited" using the experience the students have had with the activities. Relate this to limited energy resources such as coal, oil, natural gas and wood.

SUGGESTED CAREER AWARENESS ACTIVITY:

Invite the school cook to visit the class to talk about his/her job in relation to planning the use of food so that everyone gets their share of the limited amount of food that is cooked each day.

**materials:**SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will identify two (2) sources of energy that are limited.



Developed by: Dan Grimes
EME

title: "What Could You Do Without?"



limits



concept: Limitations may be viewed as relative to changing energy demands.

objective: Given the opportunity, the student will identify at least two energy-consumptive devices that he/she might choose to eliminate.

time: 2 - 30 minute sessions

subject matter area: Language Arts, Art, Career Awareness

grade: 1-2

implementation:

- Activity:
1. Read Andrew Henry's Meadow, which tells the story of a boy who likes to invent things but gets in trouble with his family. He moves away to a meadow, where he builds a house to fit his special needs. Gradually, many children follow and have houses built according to their needs.
 2. The book serves as a basis for a discussion of what students' houses would look like if they could build them.
 - a. Discuss whether students could really live in houses like those in the book.
 - b. Discuss what would really be needed in a house in order to live in it year-round.
 - c. Discuss which machines and appliances might not be needed or which the students would be willing to do without.
 3. Students will write about or draw pictures of at least two machines or appliances that they might do without.
 - a. Bring into discussion, if the machines are working less, who will be working more?

SUGGESTED CAREER AWARENESS ACTIVITY:

Invite a builder to speak to the class about his/her job. List jobs involved in building a house.

materials:



Drawing or writing paper.
Book - Andrew Henry's Meadow, Doris Burn, Coward-McCann, Inc. Published 1965.

SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will identify at least two (2) energy consumption devices whose use he/she could eliminate.



Developed by: Joanne Martina
Everett School District
Everett, WA

Revised by: Dan Grimes, EME

title: "The Generous Garbage Collector"



limits



concept: Limitations may be viewed as relative to changing energy demands.

objective: Given the opportunity, the student will identify at least three things in his/her home that could be reused which are now wasted.

time: 2 - 30 minute sessions

subject matter area: Science, Social Studies

grade: 1-2

implementation:

- Activity:
1. Read Dear Garbage Man, a book about a garbage man who goes on a saving spree. He gives things which people throw away to other people who might use them.
 2. This book serves as a natural base for the discussion of reuse of materials.
 - a. Discuss things that might be reused which are usually thrown away.
 - At home.
 - At school.
 - b. Discuss how we can save energy by reusing paper and plastic.
 3. Students will draw pictures of at least three things that they could reuse.
 4. Students will be encouraged to bring items to school for reuse, such as; plastic bottles, magazines, margarine containers, old wrapping paper.

SUGGESTED CAREER AWARENESS ACTIVITY:

Invite a garbage collector to come to the class to be interviewed about his/her job.

materials:



Labeled boxes for reusable materials.

9" x 12" drawing paper.

Books:

Dear Garbage Man, Eugene Zion,
Scholastic Books, Harper-Row 1957.

Just A Box, Goldie Taub Chernoff,
Scholastic Books.

SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will identify at least three (3) things that can be reused.

Developed by: Joanne Martina
Everett School Dist.
Everett, WA

Revised by: Dan Grimes, EME

FUTURE SOURCES OF ENERGY

GOAL :

IT IS ESSENTIAL THAT EACH PERSON KNOW
THAT NEW ENERGY SOURCES AND MORE EFFICIENT
SYSTEMS, ACCOMPANIED BY DIFFERENT CONSUMPTION
PRACTICES MAY ALTER THE WORLD ENERGY DILEMMA.



ACTIVITY
DESCRIPTION PAGE

FUTURE (1-3)

GOAL: It is essential that each person know that new energy sources and more efficient systems, accompanied by different consumption practices may alter the world energy dilemma.

Concept: Energy availability will affect future lifestyles and cultural conditions.

Activity #1 "Conserve Today for Tomorrow"
Grade level 1-3 Time: 2 - 30 minute sessions
Science, Art

Given the opportunity, the student will identify at least four ways in which he/she can conserve energy in order to make it a future energy source.

Concept: Energy policy decisions will affect the availability and distribution of energy in the future.

Activity #2 "Something That Lasts"
Grade level 1-3 Time: 2 - 30 minute sessions
Language Arts

Given the opportunity, the student will identify at least two things that can be reused many times or over a long period of time.

title: "Conserve Today for Tomorrow"



future



concept: Energy availability will affect future lifestyles and cultural conditions.

objective: Given the opportunity, the student will identify at least four ways in which he/she can conserve energy in order to make it a future energy source.

time: 2 - 30 minute sessions

subject matter area: Science, Art

grade: 1-3

implementation:

- Activity:
1. Read Farewell to Shady Glade by Bill Peet.
 2. Discuss the fact that we are using up land.
 3. Ask the following questions:
 - a. What other things are we using up? (Energy should come from students.)
 - b. Can we save energy?
 - c. Can we save energy in other places than at school?
 4. Follow discussion by suggesting four areas in which a student could save energy:
 - a. Home.
 - b. School.
 - c. Community.
 - d. Shopping.
 5. Each student will paint or draw how he can save energy in each of these categories.

materials:

12" x 18" drawing paper
or easel painting paper
Farewell to Shady Glade - Bill Peet

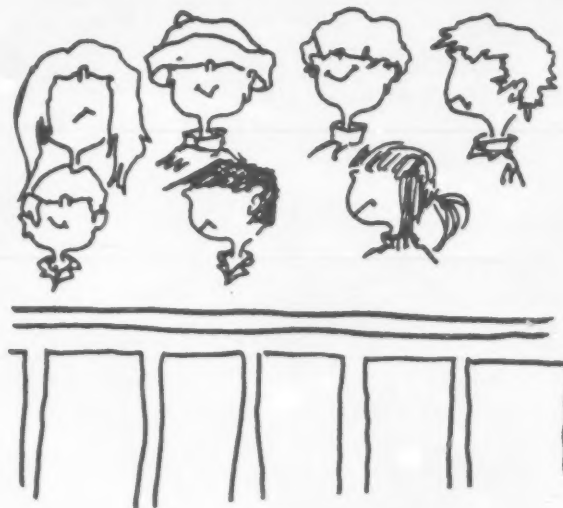


implementation:



SUGGESTED CAREER AWARENESS ACTIVITY:

Make a list of 3-5 workers on the board. Discuss the kind of work they do. Try to determine which job or jobs require more physical energy output. Lead the students to identify ways that some of this physical energy could be saved.



materials:



SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will demonstrate four ways in which he/she can conserve energy.

Developed by: Joanne Martina
Everett School District
Everett, WA

Revised by: Dan Grimes
EME

title: "Something That Lasts"



future



concept: Energy policy decisions will affect the availability and distribution of energy in the future.

objective: Given the opportunity, the student will identify at least two things that can be reused many times or over a long period of time.

time: 2 - 30 minute sessions

subject matter area: Language Arts

grade: 1-3

implementation:

- Activity:
1. Teacher will read Once There Was a Tree which tells the life story of a tree. It emphasizes the many uses of the tree over a long period of time. Or show a film on this subject.
 2. Discuss with the class the many ways in which the tree is useful.
 3. The teacher should ask the following questions:
 - a. Are there any things that we have which can be used many times or for a long time? (Possible answers: Clocks, furniture, tools, books, dishes, etc.)
 - b. Are there some things that we use that wear out fast? (Possible answers: Televisions, appliances, cars, etc.)
 - c. Are there some things that you think should last longer than they usually do?
 4. Students will draw or write about two things which they think should last longer.

materials:



Drawing or writing paper
Once There Was a Tree - Phyllis S. Busch, World Publishing Company, 1968



implementation:



SUGGESTED CAREER AWARENESS ACTIVITY:

Have students write or tell about something that they do that makes people appreciate them.



materials:



SUGGESTED ASSESSMENT PROCEDURE:

Given the opportunity, the student will list at least two things that can be reused several times over in a long period of time.

Developed by: Joanne Martina
Everett School District
Everett, WA

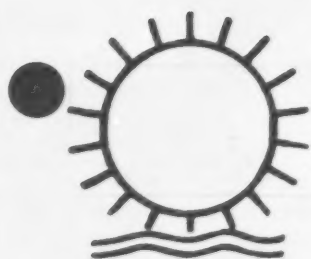
Revised by: Dan Grimes
EME

STUDENT ASSESSMENT

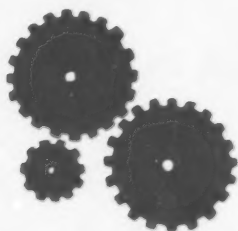
ENERGY AND CONSERVATION EDUCATION

Activities for the Classroom

Grades 1-3



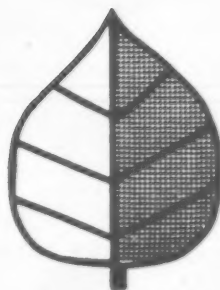
SOURCES



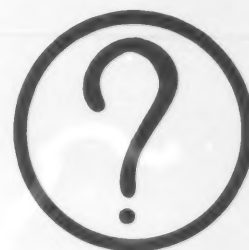
USES



CONVERSIONS



IMPACTS



FUTURE



LIMITS

STUDENT ASSESSMENT

Using The Suggested Test Items

The following test items are examples only and are not intended to be the final assessment for the entire notebook. The instructor may wish to select questions from this list to judge the preparedness of the students or to use as a nucleus for a final test covering all areas of the notebook.

Origin Of Test Items

Each test item is derived from a corresponding learning activity. For example, a suggested test item has been prepared from Sources, Activity #1. A test item has been suggested for each activity.

Type Of Suggested Test Items

Most of the test items are multiple choice, true or false, completion, "fill in the blank," or class discussion questions. For the convenience of the teacher, a "key" has been prepared, giving the answer to each question.



SUGGESTED TEST ITEMS

Grade 3 ONLY

SOURCES OF ENERGY:

- Activity #1 1. Name at least five (5) sources of energy that people use today.
a. _____ b. _____ c. _____
d. _____ e. _____
- Activity #2 2. Circle the energy source below that is taken from deep under the ground.
a. - wood
b. - sun
c. - wind
d. - oil
e. - None of the above.
- Activity #3 3. Draw a picture of how wind can be used as an energy source. (pictures will vary)
- Activity #4 4. Which of the following is not a source of energy?
a. - coal.
b. - food.
c. - ocean currents.
d. - garbage.
e. - plastic.
- Activity #5 5. Which source of energy listed below is located deep under the ground and turns into hot steam?
a. - geothermal.
b. - oil.
c. - coal.
d. - None of the above.
- Activity #6 6. Oil found deep under the ground is called:
a. - refined oil.
b. - dirty oil.
c. - crude oil.
d. - gasoline.

SUGGESTED TEST ITEMS

Grade 3 ONLY

USES OF ENERGY:

- Activity #1 1. Most objects can be reused.
T , F (Circle one)
- Activity #2 2. Playing games may take
a. - much energy.
b. - little energy.
c. - both a and b could be true.
- Activity #3 3. Machines and people both use energy and decisions about energy use must be made. Which is a correct statement?
a. - Machines make decisions.
b. - People make decisions.
c. - Both make decisions.
- Activity #4 4. Which is a complete sentence?
a. - Energy is good for doing work.
b. - Doing, saying feeling today.
c. - Energy, Work, Yesterday goes.
- Activity #5 5. An energy cycle is like a circle. CLASS DISCUSSION
- Activity #6 6. Most energy used in a home comes from
a. - the grocery store.
b. - the hardware store.
c. - ice cream stores.
d. - none of these.
- Activity #7 7. CLASS DISCUSSION
- Activity #8 8. Responsibility can be
a. - studied.
b. - talked about.
c. - carried out.
d. - all of these.
- Activity #9 9. CLASS DISCUSSION
- Activity #10 10. CLASS DISCUSSION
- Activity #11 11. What does community mean? CLASS DISCUSSION
- Activity #12 12. Pick one of the statements below and prepare a one minute talk and share it with a friend or the class.
a. - All people like some things.
b. - Children like the same things that their parents liked when they were children.
c. - Children today may have different things to like that their parents did not have when they were children.

SUGGESTED TEST ITEMS

Grade 3 ONLY

CONVERSIONS OF ENERGY:

- Activity #1 1. Which energy source helps to make plants grow?
a. - coal
b. - oil
c. - wind
d. - sun
e. - none of the above
- Activity #2 2. Energy can cause water to boil and produce steam.
Steam can cause a pinwheel to
a. - melt.
b. - glow.
c. - spin.
d. - sing.
- Activity #3 3. Complete the sentence: Potential energy is like
energy that is
a. - active.
b. - sleeping.
c. - gone forever.
d. - dangerous.
- Activity #4 4. A calorie is a measure of the amount of energy in food.
T , F (Circle one)
- Activity #5 5. The use of wheels makes travel easier.
T , F (Circle one)
- Activity #6 6. Converting energy from one form to another causes
a. - more heat.
b. - friction.
c. - heat loss.
d. - none of the above.
- Activity #7 7. An electric light bulb gives off _____ as waste energy.
a. - light.
b. - heat.
c. - smell.
d. - none of the above.
e. - all of the above.

SUGGESTED TEST ITEMS

Grade 3 ONLY

IMPACTS OF ENERGY:

- Activity #1 1. (No test item)
- Activity #2 2. Energy can be
a. - a word.
b. - measured.
c. - used.
d. - wasted.
e. - all of the above.
- Activity #3 3. (No test item)
- Activity #4 4. All changes in the environment are caused by nature.
T , F (Circle one and explain your answer)
- Activity #5 5. Name four (4) types of litter and where it might be found:
a. - _____
b. - _____
c. - _____
d. - _____
- Activity #6 6. Litter clean-up is the responsibility of
a. - schools.
b. - communities.
c. - government.
d. - all of these.
e. - none of these.
- Activity #7 7. Select a statement below:
a. - All noise is not pollution.
b. - Some noise is pollution.
c. - We don't know which noises are pollution.
Which of these statements do you feel is most easily answered by a true or false?
- Activity #8 8. CLASS DISCUSSION
- Activity #9 9. (No test item)
- Activity #10 10. Occupations change with the way energy is used.
T , F (Circle one)
- Activity #11 11. Which takes more energy to produce?
a. - A car.
b. - A pencil.
c. - A toaster.
d. - An ice cream cone.
- Activity #12 12. CLASS DISCUSSION.

(over)

IMPACTS, Cont'd:

Activity #13 13. Name two (2) things that can be recycled and tell how the recycling works.

a. - _____

b. - _____

Activity #14 14. Name three (3) things that can be recycled.

a. - _____

b. - _____

c. - _____



SUGGESTED TEST ITEMS

Grade 3 ONLY

LIMITS OF ENERGY:

- Activity #1 1. Oil is used to
a. - heat buildings.
b. - help cars work better.
c. - keep metal parts from wearing out.
d. - all of the above.
- Activity #2 2. What does the word finite mean?
- Activity #3 3. CLASS DISCUSSION
- Activity #4 4. List two sources of energy that are limited.
a. - _____
b. - _____
- Activity #5 5. CLASS DISCUSSION
- Activity #6 6. Which of the following items can be re-used?
a. - plastic bottles.
b. - wrapping paper.
c. - dog bones.
d. - all of the above.

SUGGESTED TEST ITEMS

Grade 3 only

FUTURE ENERGY SOURCES:

Activity #1 1. Name four (4) future energy sources that can be available by conserving now.

a. - _____

b. - _____

c. - _____

d. - _____

Activity #2 2. All things can be re-used.

T , F (Circle one)

_____ I need more information to answer.

ANSWER KEY
Grade 3 ONLY

SOURCES OF ENERGY

- Activity #1: (coal, gasoline, wind,
oil, water)
#2: d
#3: pictures will vary
#4: e
#5: a
#6: c

USES OF ENERGY

- Activity #1: T
#2: c
#3: c
#4: a
#5: -
#6: b
#7: -
#8: d
#9: -
#10: -
#11: -
#12: answers will vary

CONVERSIONS OF ENERGY

- Activity #1: d
#2: c
#3: b
#4: T
#5: T
#6: c
#7: a & b

IMPACTS OF ENERGY

- Activity #1: -
#2: e
#3: -
#4: F
#5: answers will vary
#6: e
#7: answers will vary
#8: -
#9: -
#10: T
#11: a
#12: -
#13: answers will vary
#14: answers will vary (e.g. newspapers, bottles, tin cans)

LIMITS OF ENERGY

- Activity #1: d
#2: Students should
understand that "finite"
means "has an end".
#3: -
#4: oil, coal
#5: -
#6: all of the above

FUTURE ENERGY SOURCES

- Activity #1: oil, coal, natural gas,
uranium
#2: more information needed